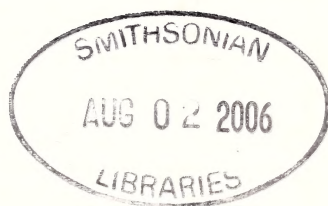


PH
38522
ENT
ISSN: 0952-7583

British Journal of ENTOMOLOGY and Natural History

Volume 18
2005



Published by the British
Entomological and Natural History
Society and incorporating its
Proceedings and Transactions

British Journal of Entomology and Natural History is published by
The British Entomological & Natural History Society
Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK.
Tel: 01189-321402. The Journal is distributed free to BENHS members.

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Registered charity number: 213149

Printed in the United Kingdom by Henry Ling Limited
at the Dorset Press, Dorchester, DT1 1HD.

BRITISH JOURNAL OF ENTOMOLOGY
AND NATURAL HISTORY

Index to Volume 18, 2005

Compiled by D. A. Young and R. D. Hawkins with the assistance of
P. J. Chandler, A. J. Halstead, N. M. Hall, P. J. Hodge and A. W. Jones

Dates of publication:

Part 1 – April 2005
Part 2 – June 2005
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April 2005

ISSN 0952-7583

Vol. 18, Part 1

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BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY



BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Published by the British Entomological and Natural History Society
and incorporating its Proceedings and Transactions

Editor: J. S. Badmin, Coppice Place, Perry Wood, Selling, nr Faversham, Kent ME13 9RB (Tel: 01227 752291) email: jbadmin@btinternet.com

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British Journal of Entomology and Natural History is published by the British Entomological and Natural History Society, Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK. Tel: 01189-321402. The Journal is distributed free to BENHS members.

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Typeset by Dobbie Typesetting Limited, Tavistock, Devon.
Printed in England by Henry Ling Ltd, Dorchester, Dorset.

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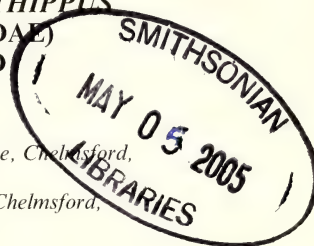
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**BEHAVIOURAL OBSERVATIONS OF *CHORTHIPPUS*
PARALLELUS (ORTHOPTERA: ACRIDIDAE)
ADULTS IN MANAGED GRASSLAND**

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ABSTRACT

A small-scale behavioural study was undertaken in 2002 to determine whether *Chorthippus parallelus* primarily inhabited the ground zone (<20 cm) or field layer (>20 cm) of a hay meadow at Writtle College, Essex. Observations of male and female behaviour were made in July and August 2002 and the frequency and duration of activities such as resting/basking, stridulation and walking were recorded. The most frequently observed behavioural activity for both male and female grasshoppers in the ground zone was resting/basking. Male individuals were rarely observed ascending into the field layer to find singing perches, most observations of stridulation were on grass stems in the ground zone. Females also rarely ventured into the field layer, perhaps because they preferred to remain close to egg laying sites. Since both sexes spent most of their time in the ground zone (<20 cm) this indicates that they are particularly prone to being killed by mechanised cutting blades which cut hay between 5–10 cm from the soil surface.

INTRODUCTION

Behavioural studies of Orthoptera have often focused on locusts in desert conditions (Chappell & Whitman, 1990). However, there have been very few behavioural observations published for species of grasshoppers endemic in the UK. Clarke (1948) described observations of the feeding of grasshoppers in the field and of the movement of the insect on disturbance. The study described the normal movement of adults without disturbance to be deliberate walking or climbing, interspersed by bouts of stridulation or feeding. Jumping only occurred when an adult found crawling difficult or was disturbed by a potential predator. These observations were confirmed by Richards & Waloff (1954) who described the small-scale movements of grasshoppers and re-iterated Clarke's view that jumping only occurred when the grasshopper was disturbed. Stridulation by male grasshoppers was most evident when solar radiation was intense and air temperatures high (Richards & Waloff, 1954).

Morris (2000) discusses the importance of vegetation structure for a wide range of arthropods, particularly Auchenorrhyncha (leafhoppers and planthoppers). However, the interaction between grasshoppers and vegetation structures in either the ground zone (<20 cm) or field layer (>20 cm) of grasslands is poorly understood. This apparent lack of information could have important consequences for habitat management and conservation of Orthoptera. When hay meadows are cut and harvested, the cut herbage remaining ranges from 5 to 10 cm in height (Ausden & Treweek, 1995). If grasshoppers spend the majority of their adult life in the field layer (>20 cm) then mowing for hay in July may remove singing perches for males. However, if adult life cycles are conducted predominantly in the ground zone

(<20 cm), then the process of cutting and harvesting may lead to serious disturbance to reproduction.

The aim of the study reported in this paper was to assess whether *Chorthippus parallelus* Zetterstedt adults utilise the ground zone or field layer in a managed hay meadow and to observe the incidence of behavioural activities such as resting/basking and walking.

METHODS

Study site

The site chosen for the observation of behavioural activities was a traditionally managed hay meadow (Stoneyshotts Meadow) on the Writtle College Estate, Chelmsford, Essex, UK (OS grid ref: TL 672069). The meadow is approximately 1 ha in area overlaying a well-drained sandy clay loam with flints (Bengeo complex, pH 7.5–8). The meadow was formerly a gravel pit (Neate, 1979) and has since been filled with refuse and soil to create a conservation area on the estate (meadow established in 1996). The vegetation of the meadow is predominantly grasses such as *Cynosurus cristatus* L. and *Arrhenatherum elatius* L., however other chalk grassland species such as *Lotus corniculatus* L. also occur. The sward height is variable with some very tall, coarse patches of grass (>50 cm sward height) and shorter areas (<5 cm sward height) with an abundance of bare earth. The grassland is mown once a year in summer (late August) and the crop harvested.

Behavioural observation sessions

Observations of adult *C. parallelus* activity were made in July and August 2002. The durations of all the behavioural activities exhibited by male and female adults were timed in sessions varying from 20 minutes to one hour, all between 1200 and 1600 h. During each session a number of individuals were observed. Adult individuals were approached very carefully to minimise disturbance. This often involved crawling through the vegetation to get near to a stridulating male or ovipositing female. Once in position, 2 m away from the individual to be observed, a five minute recovery period was allowed before observations commenced, to reduce the effect of any disturbance created during the approach. After the recovery time had elapsed, the duration in seconds of the following behavioural activities was recorded: feeding, interaction (intra-specific and inter-specific), jumping, mating, oviposition (♀ probing ground with ovipositor; eggs may or may not be being laid), resting/basking (individual stationary on vegetation or soil surface and either directly or indirectly basking), stridulation (♂ rubbing row of stridulatory pegs on the inside of hind femur against the flexed forewings, whole sequence of 'chirps' counted as one stridulation) and walking. For each behavioural activity, the location was recorded as having occurred at sward heights <20 cm (ground zone) and >20 cm (field layer) to ascertain the vertical distribution of behavioural activities in the sward. Additionally, the location of each activity on grass leaf, grass stem and inflorescence or bare earth was recorded.

Sward characteristics

The number of observations of each behavioural activity in the ground zone and field layer was compared with the vertical distribution of herbage biomass, leaf area

and temperature in the sward microclimate. A stratified clip method for the estimation of biomass and its vertical distribution was used (Rhodes, 1981). A herbage gripping device, a plier-like instrument with extended jaws that had parallel gripping surfaces, was used (Barthram *et al.*, 2000). The gripping surfaces were lined with rubber and were 9 cm long, 1 cm deep and opened to approximately 2 cm wide. The device was placed into the sward and a sample of herbage gripped before cutting to ground level. The device gripped an area of sward approximately 10 cm². Ten samples were randomly taken from the sward, transported back to the laboratory in paper bags and cut into two layers: < 20 cm height and > 20 cm height. The herbage was dried at 80°C for two days and the dry matter yield was calculated.

To determine the location of leaves in the sward, 10 samples of herbage were taken using the herbage gripping device. The area of each leaf in the ground zone and field layer was calculated by measuring leaf length and width in mm and then multiplying this by 0.95 (Robson & Sheehy, 1981).

Sward temperature has an important influence on insects, especially for those that need to bask (Unwin & Corbet, 1991). To record the sward temperature, Tinytag temperature dataloggers (Gemini Data Loggers, Chichester, West Sussex, UK) were used. One datalogger was positioned in the ground zone (< 20 cm) and another in the field layer (> 20 cm) and hourly temperatures recorded from 9 August until 3 September 2002. The dataloggers were placed at the study site in an area dominated by *A. elatius*.

Statistical analysis

The number of observations of each behavioural activity for male and female *C. parallelus* in the ground zone (< 20 cm) and field layer (> 20 cm) were compared using chi-square analysis (χ^2) to ascertain if each activity was randomly distributed throughout the two vertical sward layers. To further analyse the usage of different sward components, the frequencies of selected behavioural activities for male and female *C. parallelus* on grass leaf and stem were compared for the ground zone (< 20 cm) and field layer (> 20 cm) using χ^2 . All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) Version 12 (SPSS, 2003) according to the methods of Mead *et al.* (1993).

RESULTS AND DISCUSSION

A total of 459 minutes were spent observing male behavioural activities, a similar duration was recorded for female observations (444 minutes). Male *C. parallelus* spent 90% of the observation time resting/basking compared with 86% of the total observation time for females. Other behavioural activities accounted for very small proportions of the total observation time for both male and female *C. parallelus*. Adult grasshoppers in this study were sedentary, spending the majority of their time resting or basking interspersed with bouts of oviposition (♀), stridulation (♂) or walking.

The most frequently observed behavioural activity for both male and female *C. parallelus* was resting/basking, with 208 (mean event time 119 seconds) and 211 (mean event time 109 seconds) behavioural observations for males and females, respectively. Walking and jumping were also commonly recorded for both sexes (105 and 138 observations for males and females, respectively), although walking was the most frequent method of locomotion in this study (80.2% and 74.2% of all locomotion bouts recorded for males and females, respectively). However, the mean duration of a walking bout for a female was approximately three times that for a male (7.7 seconds vs. 2.6 seconds).

Forty-one bouts of stridulation were observed for males (mean singing time 13.4 seconds), but there were only 15 sightings of oviposition for females (mean time of 71 seconds). Mating was seen on only one occasion and seems to confirm the conclusions of Reinhardt *et al.* (2001) who noted that mating was rarely observed in grasshopper populations. For example, *C. parallelus* was only sighted mating on three occasions out of a total of 70 observation hours in their study. Feeding was not observed for either male or female *C. parallelus* and it may be that feeding is also rarely observed in the field. In a study of the feeding preferences of captive *C. parallelus* at Writtle College in 2003, feeding damage of grass by adult individuals ranged from 1–20 feeding signs per grasshopper per week (Gardiner, unpublished data).

Both male and female *C. parallelus* were most frequently observed in the ground zone (Table 1). For males, observations of jumping ($\chi^2=12.5$, d.f. 1, $P<0.01$), resting/basking ($\chi^2=145.6$, d.f. 1, $P<0.01$), stridulation ($\chi^2=33.4$, d.f. 1, $P<0.01$) and walking ($\chi^2=86.0$, d.f. 1, $P<0.01$) were not randomly observed between the ground zone and field layer, indicating that males preferred to inhabit grassland close to the soil surface. It is particularly interesting that most observations of singing male *C. parallelus* were in the ground zone and not the field layer, as previous studies of Orthoptera have demonstrated that adults ascend into tall vegetation to find singing perches (Samways, 1994; Robinson & Hall, 2002). However, singing adult grasshoppers in tall vegetation may be particularly susceptible to predation by birds and bats (Robinson & Hall, 2002). A further indication of the dangers of ascending into the field layer was made apparent by the observation of a male individual which leapt from a height of approximately 35 cm into the web of a Wasp Spider *Argiope bruennichi* Scopoli (Araneae: Araneidae), where it was quickly killed (Fig. 1).

The locations of females in the sward were similar to those of the male. Jumping ($\chi^2=30.1$, d.f. 1, $P<0.01$), resting/basking ($\chi^2=176.5$, d.f. 1, $P<0.01$) and walking ($\chi^2=122.5$, d.f. 1, $P<0.01$) were also not randomly distributed between ground zone and field layer (Table 1). Adult female grasshoppers need bare earth for oviposition (Choudhuri, 1958) and it is reasonable to suggest that they spend the majority of their life cycle in the ground zone searching for suitable oviposition sites and mates. In this study, 15 sightings of females probing the ground with their ovipositor were made, but no egg pods were deposited during any of these occasions. It is suggested that the hardness of the soil surface (sandy clay loam) at the study site would have made it difficult for the ovipositor to penetrate the soil as *C. parallelus* females prefer to lay eggs in moist soil (Choudhuri, 1958).

Having established that the majority of behavioural activities were recorded in the ground zone (Table 1), the duration of time of each behavioural activity in the ground zone was higher than the same behavioural observations in the field layer for both sexes. For example, 99% and 95% of male stridulation and walking time, respectively, was spent in the ground zone. Females spent 96% and 90% of the observation time, walking and resting/basking in the ground zone. Particularly long bouts of resting/basking were observed for both male and female grasshoppers (maximum duration of 18 and 22 minutes, respectively) in this sward layer.

Male individuals were frequently observed resting/basking, stridulating and walking on grass leaves and stems in the sward (Table 2), with the usage of bare earth and grass spikelets being very infrequent. There were two occurrences of males singing from grass spikelets in the ground zone although neither bout lasted for long (<5 seconds for each bout). Females were often observed on the soil surface, probably searching for suitable oviposition sites or utilising the warm microclimate of bare earth for basking purposes (Key, 2000).

Table 1. Number of observations of each behavioural activity for male and female *Chorthippus parallelus* in the ground zone (<20 cm) and field layer (>20 cm) of a hay meadow, Chelmsford, Essex, 2002

Behavioural activity	♂			♀		
	Sward height (cm)			Sward height (cm)		
	<20	>20	χ^2	<20	>20	χ^2
Interaction	4	1	1.8	4	0	†
Jumping	22	4	12.5*	43	5	30.1*
Mating	1	0	†	1	0	†
Oviposition	—	—	—	15	0	†
Resting/basking	191	17	145.6*	202	9	176.5*
Stridulation	39	2	33.4*	—	—	—
Walking	100	5	86.0*	134	4	122.5*
Total	357	29	278.7*	399	18	348.1*

*observations not randomly distributed between <20 cm and >20 cm at $P<0.01$

†= test not applicable due to lack of observations or zero values



Fig. 1. Male *Chorthippus parallelus* captured by *Argiope bruennichi*. Photo: Tim Gardiner.

Table 2. Number of observations of all behavioural activities on different sward components by male and female *Chorthippus parallelus*

Behavioural activity	♂				♀			
	Bare earth	Spikelet	Leaf	Stem	Bare earth	Spikelet	Leaf	Stem
Interaction	1	0	3	1	2	0	0	2
Jumping	0	1	11	14	6	0	33	9
Mating	0	0	1	0	0	0	1	0
Oviposition	—	—	—	—	15	0	0	0
Resting/basking	11	4	92	101	61	0	102	48
Stridulation	0	2	14	25	—	—	—	—
Walking	8	0	49	48	35	0	78	25
Total	20	7	170	189	119	0	214	84

Males were frequently observed resting/basking, stridulating and walking on either leaves or stems in the ground zone (Table 3), although observations of resting/basking in the field layer were not randomly distributed between grass leaf and stem ($\chi^2 = 7.1$, d.f. 1, $P < 0.01$), with a preference for stems in the field layer. Females were often observed on grass leaves in the ground zone, particularly when resting/basking ($\chi^2 = 26.4$, d.f. 1, $P < 0.01$) or walking ($\chi^2 = 28.4$, d.f. 1, $P < 0.01$). It is suggested that females found particularly large leaves of grasses in the ground zone (mean leaf area = 524 ± 86 mm) more favourable basking perches than the smaller leaves situated in the field layer (mean leaf area = 443 ± 68 mm). In a similar fashion to males, female grasshoppers utilised grass stems more frequently when they ventured into the field layer.

Although male *C. parallelus* were most frequently observed in the ground zone, movement between different vegetational structures within this layer, particularly for

Table 3. Number of observations of selected behavioural activities of *Chorthippus parallelus* on grass leaf and stem in the ground zone (<20 cm) and field layer (>20 cm)

Behavioural activity	♂			♀		
	Leaf	Stem	χ^2	Leaf	Stem	χ^2
< 20 cm						
Resting/basking	89	87	0.2	101	40	26.4**
Stridulation	14	23	2.2	—	—	—
Walking	46	46	0.0	76	23	28.4**
> 20 cm						
Resting/basking	3	14	7.1**	1	8	5.4*
Stridulation	0	2	†	—	—	—
Walking	3	2	†	2	2	†

* = observations not randomly distributed between leaf and stem at $P < 0.05$

** = observations not randomly distributed between leaf and stem at $P < 0.01$

† = test not applicable due to lack of observations or zero values

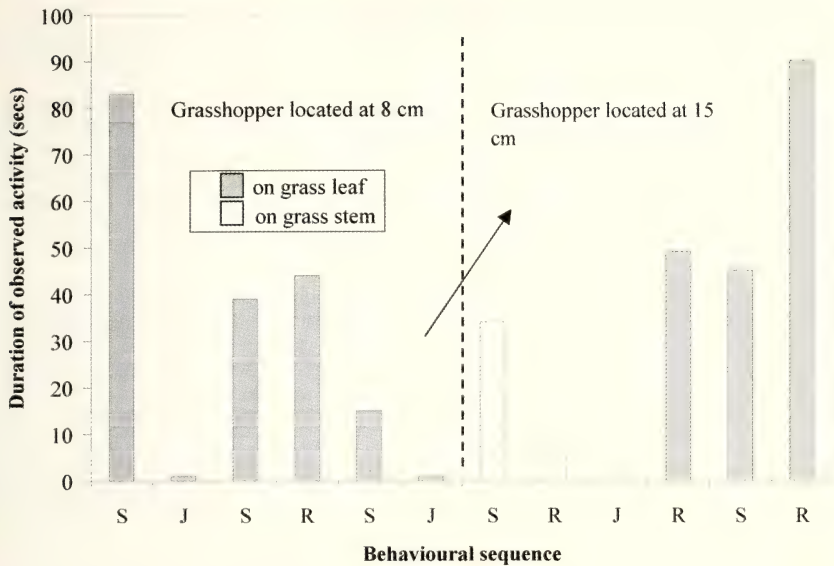


Fig. 2. Observation of a male *Chorthippus parallelus* starting with stridulation (S) at 8 cm; note how the singing sequence is interspersed by jumping (J) and resting/basking (R).

singing purposes, was frequent. The authors commenced observing one singing male situated on a grass leaf (approximately 8 cm from the soil surface) at 1300 h (temp: 25°C, cloud cover: 40%; Fig. 2). Three fairly long sequences of singing (maximum duration: 83 seconds) were observed on grass leaves. The grasshopper then leapt onto a grass stem at approximately 15 cm, where it proceeded to sing loudly once again, before jumping back onto a nearby grass leaf for a final bout of stridulation. It seemed that this grasshopper was utilising a wide range of singing perches (grass leaf and stem) within the ground zone to effectively broadcast its stridulation.

Although the observations of behaviour were only conducted for a few hours, it seems that both male and female *C. parallelus* mainly utilise the ground zone (<20 cm) for all behavioural categories. This is unusual as microclimatic temperatures in this zone were much lower than in the field layer ($17.4^{\circ}\text{C} \pm 0.23$ vs. $20.6^{\circ}\text{C} \pm 0.47$, respectively) where conditions were more favourable for insolation. Sward temperatures in the ground zone may be lower due to increased vegetation biomass (1.53 vs. 0.71 kg dry matter per m²). However, 67% of the total grass leaf area was found in the ground zone and females in particular, favoured the abundant grass leaves for resting/basking purposes.

Since both male and female *C. parallelus* grasshoppers resided for the majority of time in the ground zone (<20 cm) this may lead to high mortality when cutting of hay occurs. Grasshoppers are however very mobile and can jump long distances to escape from predators (Clarke, 1948; Richards & Waloff, 1954) and as a consequence may be able to escape damage or death during harvesting of the crop. Further research is needed to determine whether grasshoppers are killed by mechanised cutting blades. However, the process of cutting hay will produce large-scale disturbance to grasshoppers inhabiting the ground zone in the important reproductive phase of their life cycle.

REFERENCES

- Ausden, M. & Treweek, J. 1995. Grasslands. In: Sutherland, W.J. & Hill, D.A. (Eds.) *Managing habitats for conservation*. Cambridge University Press, Cambridge pp. 197–229.
- Barthram, G.T., Elston, D.A. & Bolton, G.R. 2000. A comparison of three methods for measuring the vertical distribution of herbage mass in grassland. *Grass & Forage Science* **55**: 193–200.
- Chappell, M.A. & Whitman, D.W. 1990. Grasshopper thermoregulation, pp. 143–172. In: Chapman, R.F. & Joern, A. (Eds.) *Biology of grasshoppers*. John Wiley & Sons, Chichester.
- Choudhuri, J.C.B. 1958. Experimental studies on the choice of oviposition sites by two species of *Chorthippus* (Orthoptera: Acrididae). *Journal of Animal Ecology* **27**: 201–215.
- Clarke, E.J. 1948. Studies in the ecology of British grasshoppers. *Transactions of the Royal Entomological Society of London* **99**: 173–222.
- Key, R. 2000. Bare ground and the conservation of invertebrates. *British Wildlife* **11**: 183–191.
- Mead, R., Curnow, R.N. & Hasted, A.M. 1993. *Statistical methods in agriculture and experimental biology* (2nd edition). Chapman & Hall, London.
- Morris, M.G. 2000. The effects of structure and its dynamics on the ecology and conservation of arthropods in British grasslands. *Biological Conservation* **95**: 129–142.
- Neate, D.J.M. 1979. *Writtle Agricultural College wildlife and landscape survey: report and recommendations*. Writtle College, Chelmsford.
- Reinhardt, K., Samietz, J., Wagner, G., Opitz, S. & Köhler, G. 2001. Diel and seasonal mating peaks in grasshopper populations (Caelifera: Acrididae). *Journal of Orthoptera Research* **10**: 263–269.
- Rhodes, I. 1981. Canopy structure. In: Hodgson, J., Baker, R.D., Davies, A., Laidlaw, A.S. & Leaver, J.D. (Eds.) *Sward measurement handbook*. British Grassland Society, Hurley pp. 141–158.
- Richards, O.W. & Waloff, N. 1954. Studies on the biology and population dynamics of British grasshoppers. *Anti-Locust Bulletin* **17**: 1–182.
- Robinson, D.J. & Hall, M.J. 2002. Sound signalling in Orthoptera. *Advances in Insect Physiology* **29**: 151–278.
- Robson, M.J. & Sheehy, J.E. 1981. Leaf area and light interception. In: Hodgson, J., Baker, R.D., Davies, A., Laidlaw, A.S. & Leaver, J.D. (Eds.) *Sward measurement handbook*. British Grassland Society, Hurley pp. 115–139.
- Samways, M.J. 1994. *Insect conservation biology*. Chapman & Hall, London.
- SPSS. 2003. *SPSS version 12*. SPSS Inc, Chicago.
- Unwin, D.M. & Corbet, S.A. 1991. *Insects, plants and microclimate*. Richmond Publishing Co, Slough.

SHORT COMMUNICATION

***Odynerus melanocephalus* (Gmelin) (Hymenoptera: Vespidae) and *Lasioglossum malachurus* (Kirby) (Hymenoptera: Halictidae) in Berkshire.** – I swept a single female *Odynerus melanocephalus* from open, disturbed clayey ground, at margins of old gravel workings near Field Farm, Berkshire (SU6770) on 11.vi.2003. Although widespread in Southern England (Falk, 1991), there do not appear to be any previous recordings from Berkshire (VC22). Other scarce wasps present included *Gynomerus laevipes* (Shuckard) and *Nysson trimaculatus* (Rossius) (Sphecidae). Other aculeates included two female *Lasioglossum malachurus* (Kirby) (Halictidae) swept in the same area, new to Berkshire. *Lasioglossum pauxillum* (Schenck) was also present at this site on the 30.viii.2003, and at Theale Lake (SU6670) on the same day; the only previous record for this species from Berkshire dates from 1906 (Falk, 1991). – JONTY DENTON, Kingsmead, Wield Road, Medstead, Hampshire GU34 5NJ

REFERENCE

- Falk, S. 1991. *A review of the scarce and threatened bees, wasps, and ants of Great Britain*. JNCC, Peterborough.

ROTHERFIELD PARK, NORTH HAMPSHIRE: AN IMPORTANT SITE FOR SAPROXYLIC COLEOPTERA, DIPTERA AND OTHER INSECTS

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ABSTRACT

The insect fauna of Rotherfield Park, North Hampshire was sampled in 2002. A rich coleopteran and dipteran fauna was identified, with several new Vice-county records. The saproxylic beetle fauna was used to calculate site quality indices, which were compared with other sites in north-east Hampshire, and show the Park to be of considerable local importance. The richest Dipteran fauna was associated with the more closed woodland habitats rather than around the open parkland trees. In contrast, most of the more important coleopteran records were made on standards in the open parkland.

INTRODUCTION

Rotherfield Park lies between Alton and Petersfield in North Hampshire (VC12). It is one of the most complete examples of early 19th Century Picturesque, the house and landscape being of immense historic and cultural interest (Hussey, 1967). The complex of parkland and woodland also provides important habitats for wildlife, and our surveys in 2002 revealed an important invertebrate assemblage.

The Park was first mentioned in 1564 (Coates, 1989) and in its current form covers approximately 200 hectares of rolling terrain on chalk with areas of clay-with-flints, and consists of open pasture land grazed by cattle with scattered mature standards mostly of beech, oak, sycamore and sweet chestnut. There are also scattered small groups of 3–10 mature trees as well as more extensive copses with abundant beech, hawthorn, sloe and yew. The Park encompasses two larger woodland blocks: Plash Wood (SU6932) lies to the north of the house and appears on an estate map of 1635, but is clearly much older, and Stonybrow Wood and Plantation (SU6830) stand along the south-western edge of the estate. Both woods have abundant beech including many fine mature trees, and extensive coppice woodland with abundant hazel.

One of the most striking features of the Park is the avenue of lime *Tilia x vulgaris* L. trees, which run southward from the main house. These were already large trees 200 years ago and these have developed much side growth, forming what can only be described as two giant hedgerows lining the old driveway. The Park falls within SU63 and SU73 10 km squares of the National Grid.

Dead wood, both standing and fallen, is locally abundant across the Park and many large fallen trees have been left *in situ* where they continue to attract invertebrate interest. Large boles of fallen trees have also been placed along the margins of the copses.

The mature parkland trees were the main focus of the saproxylic beetle survey (i.e. those species associated with wood decay and deadwood), whilst the more sheltered wooded areas were targeted for Diptera.

SITE VISITS AND METHODS

Site visits were made from mid March–late October 2002, when standard field techniques of beating, sweep netting and grubbing were employed to sample the invertebrate fauna. In addition small bottle traps primed with a fermenting ‘sap’ mixture were placed in hollow trees and emptied at weekly intervals during May and June 2002.

The quality of the saproxylic beetle fauna of Rotherfield Park was assessed using two recognized indices, and the result compared with other important sites in North and East Hampshire.

Index of Ecological Continuity (IEC)

This method of measuring the quality of the saproxylic Coleoptera fauna was developed by Harding & Alexander (1994), using the scores assigned to 195 species in Harding & Rose (1986), which were divided into three groups ‘according to the extent to which they have been consistently recorded from areas of ancient woodland with a continuity of dead wood habitats’. Grade 1 indicators (those species deemed the most dependent on ancient dead wood habitats) scored 3 points, Grade 2 scored 2 points, and Grade 3 species scored 1 point. Alexander (2004) refined this method using data collected over the past decade or so. This has resulted in some minor modifications to the original list of qualifying species, see Appendix 1.

Species Quality Index (SQI)

The Species Quality Score (SQS) and Species Quality Index (SQI) are different ways of comparing sites, which are not dependent on cumulative sampling effort. Fowles *et al.* (1999) assigned quality scores to native saproxylic Coleoptera, ranging from 1 for common species to 32 for Red Data Book (RDB) taxa (but the statuses have in many cases been revised from those in Hyman & Parsons (1992)). The SQS is produced by adding together the assigned scores for the species captured: the SQI is then calculated by dividing the SQS by the total number of species and multiplying by 100. This gives a score that can be used for comparative purposes which overcomes the problems of differences in sampling effort, providing at least 50 species are recorded.

RESULTS

In all, 175 species of Coleoptera were recorded of which 125 (71%) were taxa included in the checklist of invertebrates of living and decaying timber (Alexander, 2002), and of 270 species of Diptera recorded, 80 (30%) were also included in this checklist. The richest dipteran fauna was associated with the more closed woodland habitats rather than around the open parkland trees. In contrast, most of the more important coleopteran records were made on standards in the open parkland. Species of Notable status are listed below:

Coleoptera

Scydmaenus rufus Müller & Kunze (Scydmaenidae) (RDB2). Occurs under bark of hardwoods and pines. This species appears to be increasing, and is not uncommon in North-East Hampshire/Surrey and Berkshire (Denton, 1999).

Mycetophagus quadriguttatus Müller (Mycetophagidae) (Notable A in Hyman & Parsons, 1992). A male found under the bark of a dead but standing sycamore on 2.vi.2002 may be the first record for North Hampshire.

Variimorda villosa (Schränk) (Nb) (Mordellidae). This species is not uncommon in Surrey and North Hampshire, especially on the chalk. Though formerly included in the IEC (Harding & Rose, 1986), doubt has been cast on whether it is a saproxylic species, but the female captured in the park flew to, and began to probe a large beech stump with her abdomen, on the 28.v.2002.

Anthrribus nebulosus Förster (Anthribidae) (Nb). This species is often found on large oak trees in old parkland. It was beaten from a large oak on 2.vi.2002.

Cionus nigritarsis Reitter (Curculionidae) (Na). Abundant on Dark Mullein *Verbascum nigrum* L. The chalk of North Hampshire and Wiltshire is a stronghold nationally for this species.

Taphrorychus bicolor (Herbst) (Na). Found in beech bark near Plash Wood on 28.v.2002. This may be the first record for North Hampshire.

Diptera

Atypophthalmus inustus (Meigen) (Limoniidae). Notable according to Falk (1991). This is a local species that develops in wood-encrusting fungi and is usually found in low numbers, mostly in ancient woodland sites.

Ditomyia fasciata (Meigen) (Ditomyiidae) (N). Associated with a wide range of hard polypore wood-decaying fungi in old woodlands mainly beech. Widespread in Southern England.

Exechiopsis membranacea (Lundström) (Mycetophilidae) (N). A local species of woodland and carr in southern England, 11 sites listed in Falk & Chandler (in prep.) including the New Forest and Leckford in Hampshire. Biology unrecorded but probably develops in gill fungi.

Mycetophila hetschkoi Landrock (Mycetophilidae) (N). This is a local fly found mostly in damp woodland, throughout Britain but mostly in the north and west, although recorded from Hampshire. It develops in soft terrestrial fungi such as *Hydnum* and *Ramaria*.

Trichonta clavigera Lundström (Mycetophilidae) (N). Previous Hampshire records include several sites in the New Forest and Selborne Hanger. Biology unrecorded but probably in wood encrusting fungi.

Mycomya occultans (Winnertz) (Mycetophilidae). Recognized as RDB2 in Falk & Chandler (in prep.) which lists six sites in South Wales and Kent; but has since been recorded at sites in Buckinghamshire, Somerset and Suffolk so is proving more widespread than first thought and further downgrading may be necessary. It develops in bracket fungi such as *Daedalea* and *Piptoporus* growing on broad-leaved trees.

Diazosma hirtipenne (Siebke) (Trichoceridae) (N). This species is widespread in Britain as far as northern Scotland, but seems very local, occurring mainly in dry woodland; there are records from Hertfordshire and Berkshire and it was recorded at Lackham, Wiltshire in 2002 (Chandler, 2003). It has been found around dead wood but also reared once from a bird's nest. This is the first record for Hampshire.

Systemus tener Loew (Dolichopodidae). RDB3 in Falk (1991), but considered insufficiently known by Falk & Crossley (in prep.), with old records from the New Forest and Herefordshire and recent records from Kent. Members of this genus develop in tree rot holes and are most often recorded by rearing, so it is considered that they are significantly under-recorded by general collecting methods.

Paraplatypeza bicincta (Szilády) (Platypezidae). This species was only added to the British list in 2002 (Chandler, 2002a) from a single female found at West End Common, Esher, Surrey in 2001. A further female was found at Waggoner's Wells, Hants on the same day as the find at Stonybrow Wood (Chandler, 2002b). The biology is unknown but the allied species *P. atra* (Meigen) develops in gill fungi, mainly the lignicolous species *Pluteus cervinus*. As *P. bicincta* is evidently widespread it is curious that it has not been recorded previously, but it is scarce throughout its European range, which includes Holland and Denmark.

Sapromyza albiceps Fallén (Lauxaniidae). Downgraded from RDB3 (Shirt, 1987) to Notable in Falk 1991 and in Falk & Ismay (in prep.), which refers to 20 post-1960 sites. This is a local but widespread species throughout Britain. Adults are usually swept from tree foliage, though the biology of this species is unrecorded; this family mainly develop in decaying vegetation.

Megamerina dolium (Fabricius) (Megamerinidae) (N). A single male was found in a rotting hollow of a large beech tree in Stoneybrow Wood on 3.vii.2002. This species develops under the bark of hardwoods where the larvae are predatory (Alexander, 2002).

Paraclusia tigrina (Fallén) (Clusiidae) (RDB2). Associated with decaying timber, including beech and lime. This species is proving to be widespread in southern England, but the authors are not aware of any other North Hampshire records.

Gymnosoma rotundatum (L.) (Tachinidae) (RDB3). This record constitutes the most south-westerly for the species in Britain (Chris Raper, *pers. comm.*). This fly is quite frequent within a very limited area of the South of England, centred on Surrey and adjacent counties, where it is thought to parasitize shieldbugs including *Palomena prasina* (L.) (Hem: Pentatomidae).

Other locally important records included:

Hemiptera

Pediopsis tiliae (Germar) (Cicadellidae) (Notable B). A leafhopper associated with lime trees, abundant in the lime avenue during June and July. This is probably the first record for North Hampshire (VC12).

Lepidoptera

Chrysoclista lineella (Clerck) (Cosmopterigidae). A beautiful micro-moth which develops in the bark of lime trees; adults were swept from the lime avenue on the 31.vii.2002. The only previous record in North Hampshire is from Northington (Goater & Norriss, 2001).

Hymenoptera

Lasius brunneus (Latreille) (Formicidae) (Na). Found on two large oaks in the open park. Rotherfield Park occurs at the most south-western edge of the known range of this very localised arboreal ant in the UK.

Vespa crabro L. (Vespidae) (local). The hornet is surprisingly scarce in Surrey and North Hampshire, which both have huge areas of suitable-looking habitat. In recent years there are signs that it is spreading in both counties, and this is the first time JD has encountered the species in the Alton area, though he has also recorded it in recent years at Bartley Heath near Hook.

COMPARISON OF SAPROXYLIC BEETLE FAUNAS

The beetle assemblage identified in 2002 had an Index of Ecological Continuity (IEC) of 27, comprising one Grade 2, and twenty-five Grade 3 indicators. This score is quite impressive for just one year's field-work at a site with few veteran oaks.

Table 1. Important sites for saproxylic Coleoptera in North and East Hampshire

	No.of species	IEC	SQS	SQI
Harewood Forest	102	42	430	422
Bramshott Common/Chase	140	39	524	374
Rotherfield Park	120	27	404	337
Woolmer Forest	100	22	330	330
Henwood/Chappetts Copse	88	20	260	311
Micheldever Spoil Heaps	57	13	160	280
Odiham Common	95	17	263	277
Binswood	80	17	212	265

The 120 saproxylic Coleoptera which made up the Species Quality Score (SQS) are shown in appendix 1. These produced a SQS total of 404, which gives a SQI of 337. Within the East Hampshire District this site is clearly one of the richest for dead wood beetles, and is only surpassed by Bramshott Common and Chase (table 1). Few scores have been generated for sites further afield in North Hampshire, except from JD's data, and for Harewood Forest (see Fowles *et al.*, 1999; Martin Townsend, pers. comm.), so at present it is difficult to assess the site's importance. However, the beetle fauna in the Park is likely to be very representative of the typical saproxylic fauna of old wooded habitats on the chalk in North-East Hampshire, with species associated primarily with beech well represented.

DISCUSSION AND CONCLUSIONS

The parkland and associated woodland of Rotherfield Park supports a varied and rich invertebrate fauna associated with dead wood habitats. New county records of Nationally Scarce Diptera and Coleoptera confirm the Park's importance as a regionally significant site for saproxylic beetles and flies. Other Nationally Scarce arboreal insects such as the leafhopper *P. tiliae* and the fungus weevil *A. nebulosus* appear to favour large parkland trees.

Important finds from other groups indicate that the woodland edges and rough grassland habitats across the Park also support some important insects such as *G. rotundatum* and *C. nigritarsis*, and PC made one of the first British records of the moth fly *Saraiella consigliana* (Sara) (Withers, 2004). Further records include three very local staphylinid beetles *Atheta hybrida* (Sharp), *Quedius invreae* Gridelli (Denton, 1998) and *Stenus fuscicornis* Erichson, made in 1997.

The Park is a working estate, which is managed sympathetically for wildlife, and the continued survival of such a rich invertebrate assemblage within an important historic landscape remains a challenge, requiring a long-term perspective. It is significant that mature native trees set in open parkland prove especially attractive to many rare beetle species, which are absent or rare in closed woodland. The maintenance of old parklands is pivotal for the survival of many of our rarer species, and provides an opportunity to marry the cultural and ecological disciplines for the benefit of both.

ACKNOWLEDGEMENTS

The authors would like to extend their thanks to Sir James Scott for supporting this survey work across the estate, and to Lou Elderton for providing much useful

background information on the history of the Park. Thanks also to East Hampshire District Council, in particular to Gavin Musk for help in providing funds to support the survey, and to English Nature for providing funding via the Biodiversity Grant Scheme. Many thanks to Adrian Fowles for checking the SQI scores and useful comments on the data.

REFERENCES

- Alexander, K.N.A. 2002. *The invertebrates of living and decaying timber in Britain and Ireland. English Nature Research Reports*. No. 467. English Nature, Peterborough.
- Alexander, K.N.A. 2004. Revision of the Index of Ecological Continuity as used for saproxylic beetles. *English Nature Research Report Number 574*. English Nature, Peterborough.
- Chandler, P.J. 2002a. *Paraplatypeza bicincta* (Szilády, 1941) (Diptera, Platypezidae) new to Britain. *Dipterists Digest (Second Series)* 9: 23–24.
- Chandler, P.J. 2002b. *Agathomyia sexmaculata* (von Roser) (Diptera, Platypezidae) new to Britain and some other recent records of Platypezidae. *Dipterists Digest (Second Series)* 9: 161–163.
- Chandler, P.J. 2003. *Syntormon macula* Parent (Diptera, Dolichopodidae) and other Diptera new to Wiltshire. *Dipterists Digest (Second Series)* 10: 66.
- Coates, R. 1989. *The place names of Hampshire*. Batsford.
- Denton J.S. 1998. *Atheta hybrida* (Sharp) (Staphylinidae) in Hampshire. *Coleopterist* 7: 6.
- Denton, J.S. 1999. Is *Scydmaenus rufus* Müller & Kunze really vulnerable? *Coleopterist* 8: 89.
- Falk, S. 1991. *A review of the scarce and threatened flies of Great Britain (Part 1)*. Research and survey in nature conservation No. 39. Peterborough, Nature Conservancy Council.
- Falk, S. & Chandler, P.J.. (in preparation) *A review of the scarce and threatened flies of Great Britain: Nematocera and Aschiza*. JNCC.
- Falk, S. & Crossley, R. (in preparation) *A review of the scarce and threatened flies of Great Britain: Empidoidea*. JNCC.
- Falk, S. & Ismay, J. (in preparation) *A review of the scarce and threatened flies of Great Britain: Acalyptratae*. JNCC.
- Fowles, A.P., Alexander, K.N.A. & Key, R.S. 1999. The saproxylic index: evaluating wooded habitats for the conservation of dead wood Coleoptera. *Coleopterist* 8: 121–141.
- Goater, B. & Norriss, T. 2001. *Moths of Hampshire and the Isle of Wight*. Pisces.
- Harding, P.T. & Alexander, K.N.A. 1994. The use of saproxylic invertebrates in the selection and evaluation of areas of relic forest in pasture woodlands. *British Journal of Entomology and Natural History* 7 Suppl. 1: 21–26.
- Harding, P.T. & Rose, F. 1986. *Pasture Woodlands in lowland Britain*. Monks Wood, Institute of Terrestrial Ecology.
- Hussey, C. 1967. *Picturesque: Studies in a point of View*. Frank Cass.
- Hyman, P.S & Parsons, M.S. 1992. *A review of the scarce and threatened Coleoptera of Great Britain*. Part 1. JNCC, Peterborough.
- Shirt, D.B., ed. 1987. *British Red Data Books: 2. Insects*. Peterborough, Nature Conservancy Council.
- Withers, P. 2004. Additions to the British Moth Fly fauna (Dip., Psychodidae) *Pericoma sziladyi* Szabó and *Saraiella consigliana* (Sara). *Dipterists Digest (Second Series)* 10: 111–113.

APPENDIX 1.

SAPROXYLIC COLEOPTERA USED TO CALCULATE SPECIES QUALITY SCORE AND INDEX OF ECOLOGICAL CONTINUITY (IEC) AT ROTHERFIELD PARK

Histeridae: *Abraeus globosus* (Hoffmann), *Paromalus flavicornis* (Herbst). **Ptilidae:** *Ptinella aptera* (Guerin-Meneville). **Leiodidae:** *Anisotoma humeralis* (Fab.). **Scydmaenidae:** *Scydmaenus rufus* Müller & Kunze. **Staphylinidae:** *Dropephylla ioptera*

(Stephens), *Dropephylla vilis* (Erichson), *Phloeonomus punctipennis* Thomson, *Hapalarea pygmaea* (Paykull), *Phloeocharis subtilissima* Mannerheim, *Atracus affinis* (Paykull), *Gabrieus splendidulus* (Gravenhorst), *Sepedophilus bipunctatus* (Gravenhorst), *Gyrophaena minima* Erichson, *Gyrophaena latissima* (Stephens), *Siagonum quadricorne* Kirby, *Homolota plana* (Gyllenhal), *Anomognathus cuspidatus* (Erichson), *Leptusa fumida* Kraatz, *Leptusa ruficollis* (Erichson), *Bolitochara lucida* (Gravenhorst), *Atheta liturata* (Stephens), *Dinaraea aequata* (Erichson), *Phloeopora testacea* (Mannerheim), *Scaphisoma argaricum* (L.), *Scaphidium quadrimaculatum* Olivier. **Lucanidae:** *Dorcus parallelipipedus* (L.), *Sinodendron cylindricum* (L.). **Scirtidae:** *Prionocyphon serricornis* (Müller). **Buprestidae:** *Agrilus sinuatus* (Olivier). **Elateridae:** *Denticollis linearis* (L.), *Stenagostus rhombeus* (Olivier), *Melanotus villosus* (Fourcroy). **Cantharidae:** *Malthinus flaveolus* (Herbst), *Malthinus frontalis* (Marsham), *Malthinus seriepunctatus* Kiesenwetter, *Malthodes marginatus* (Latreille), *Malthodes minimus* (L.). **Lycidae:** *Platycis minuta* (Fab.). **Dermestidae:** *Ctesias serra* (Fab.). **Anobiidae:** *Ptinomorphus imperialis* (L.), *Xestobium rufovillosum* (De Geer), *Hemicoeus fulvicornis* (Sturm), *Anobium inexpectatum* Lohse, *Grynobius planus* (Fab.), *Ptilinus pectinicornis* (L.). **Melyridae:** *Dasytes aeratus* Stephens, *Malachius bipustulatus* (L.). **Cleridae:** *Tillus elongatus* (L.). **Nitidulidae:** *Epuraea marsueli* Reitter, *Epuraea silacea* (Herbst), *Glischrochilus quadriguttatus* (Fab.). **Laemophloidae:** *Cryptolestes ferrugineus* (Stephens). **Rhizophagidae:** *Rhizophagus bipustulatus* (Fab.), *Rhizophagus dispar* (Paykull), *Rhizophagus ferrugineus* (Paykull). **Sphindidae:** *Aspidiphorus orbiculatus* (Gyllenhal). **Cucujidae:** *Pediacus dermestoides* (Fab.). **Silvanidae:** *Silvanus unidentatus* (Olivier). **Cryptophagidae:** *Cryptophagus dentatus* (Herbst), *Cryptophagus ruficornis* Stephens. **Biphyllidae:** *Diplocoelus fagi* Guerin-Meneville, *Biphyllus lunatus* (Fab.). **Erotylidae:** *Dacne bipustulata* (Thunberg), *Triplax aenea* (Schaller). **Cerylonidae:** *Cerylon ferrugineum* Stephens, *Cerylon histeroides* (Fab.). **Endomychidae:** *Endomychus coccineus* (L.). **Latridiidae:** *Enicmus brevicornis* (Mannerheim). **Ciidae:** *Octotemnus glabriculus* (Gyllenhal), *Cis boleti* (Scopoli), *Cis micans* (Fab.), *Cis nitidus* (Fab.), *Cis pygmaeus* (Marsham), *Ennearthron cornutum* (Gyllenhal). **Mycetophagidae:** *Litargus connexus* (Fourcroy), *Mycetophagus quadriguttatus* Müller, *Mycetophagus quadripustulata* (L.). **Colydiidae:** *Synchita humeralis* (Fab.), *Bitoma crenata* (Fab.). **Tenebrionidae:** *Eledona agricola* (Herbst). **Tetratomatidae:** *Tetratoma fungorum* Fab. **Salpingidae:** *Lissodema quadripustulata* (Marsham), *Vincenzellus ruficollis* (Panzer), *Rhinosimus planirostris* (Fab.). **Pyrochroidae:** *Pyrochroa serraticornis* (Scopoli). **Melandryidae:** *Orchesia minor* Walker, *Orchesia undulata* Kraatz, *Conopalpus testaceus* (Olivier). **Scraptidae:** *Anaspis frontalis* (L.), *Anaspis humeralis* (Fab.), *Anaspis lurida* Stephens, *Anaspis rufilabris* (Gyllenhal). **Mordellidae:** *Mordellochroa abdominalis* (Fab.). **Aderidae:** *Aderus oculus* (Paykull). **Cerambycidae:** *Rhagium mordax* (De Geer), *Grammoptera ruficornis* (Fab.), *Alosterna tabacicolor* (De Geer), *Phymatodes testaceus* (L.), *Leptura maculata* (Poda), *Leptura melanura* (L.), *Clytus arietus* (L.), *Leiopus nebulosus* (L.), *Pogonocheirus hispidus* (L.). **Curculionidae:** *Acalles misellus* Boheman. **Scolytinae:** *Scolytus intricatus* (Ratzeburg), *Scolytus multistriatus* (Marsham), *Scolytus rugulosus* (Müller), *Scolytus scolytus* (Fab.), *Hylesinus crenatus* (Fab.), *Hylesinus varius* (Fab.), *Dryocoetinus villosus* (Fab.), *Taphrorychus bicolor* (Herbst), *Trypodendron domesticum* (L.), *Ernoporus fagi* (Fab.), *Xyleborus dispar* (Fab.), *Xyloborinus saxeseni* (Ratzeburg). **Platypodidae:** *Platypus cylindrus* (Fab.).

BOOK REVIEW

Arthropods of the Beech-wood Belt in the Northern Appennines. Edited by P. Cerretti, A. Tagliapietra, M. Tisato, S. Vanin, F. Mason & M. Zapparoli. Conservazione Habitat Invertebrati 2. 2003. Gianluigi Arcari Editore, Mantova, 256pp. ISBN 88-88499-11-3.

The National Centre for the Study and Conservation of Forest Biodiversity at Mantova in Italy has been undertaking a series of studies on the invertebrates of the state's protected areas. The first book *Invertebrates of a Padana Plain Forest: Bosco della Fontana* was published in 2002 and the book now being reviewed is the second in the series. In both volumes the text appears in both Italian and English.

Italy claims to be the first country in the world to have responded to the call made in the Convention of Biological Diversity for countries to identify the components of biodiversity that are important for its conservation and sustainable use and to carry out the corresponding monitoring. They began in 1995 to conduct censuses of the animal species present in the country, and arrived at a checklist of 57,500 species, and two monographs later have added 240 invertebrate species to the Italian fauna.

The monographs draw on the expertise of more than 60 taxonomists from home and abroad—including our own Peter Chandler as well as other such well-respected people as Emilia Nartshuk of the Russian Academy of Sciences and Martin Speight of the National Parks & Wildlife Service in Ireland. The results are being gathered in the Nature Conservation Management database and are intended to be of practical use for improving the management of the areas concerned. The monograph has a preface from Government ministers who state that the work is to be extended to other areas of the country.

An introductory section locates the areas surveyed and provides excellent maps and colour plates of the reserves covered. Geomorphology and botany are outlined, and there is then a section which discusses the zoogeographic aspects of the communities present. A final section briefly discusses the conservation implications.

The bulk of the book is devoted to a series of taxonomic sections which list the species found during the survey work carried out between 1999 and 2001. It starts with 12 colour drawings of some of the insects found, mostly Diptera, and including *Xylophagus ater* Meigen, *Chorisops caroli* Troiano and *Oxycera locuples* Loew. The sections deal with Arachnida, Chilopoda, Odonata, Orthoptera, Dermaptera, Plecoptera, Coleoptera, Neuroptera, Siphonaptera, Diptera, Trichoptera, Lepidoptera and Hymenoptera, on a family by family basis. For each family the species are listed in full together with codings for locality and how they were collected, ie by trapping, netting, sieving, etc. For key species there is also some discussion of its status and distribution. As an example the elaterid beetle *Actenicerus sjaelandicus* (O. F. Müller) is described as occurring in damp grasslands, on the edges of lakes and in peat-bogs, much as in Britain, but it has a mainly alpine distribution in Italy.

Overall this book is an important record of the fauna of these Italian beech-woods and provides an interesting model for similar inventory and conservation work elsewhere. It would be excellent if other countries were to initiate similar projects and make the site records available to wider audiences in this way—site inventories are all too often consigned to appendices or annexes to site Management Plans and never see light of day beyond the site office. There are too few records of this quality. Increasingly we are seeing an interest in Europe-wide co-operation in invertebrate conservation; this is one of the few examples where something tangible has already resulted. The Mantova centre is to be congratulated on its visionary approach.

KEITH N. A. ALEXANDER

ARE PITFALLS BIASED? A COMPARISON OF CARABID COMPOSITION FROM PITFALL TRAPPING AND HAND SEARCHING IN FOREST HABITATS

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ABSTRACT

There have been concerns over potential biases from the use of pitfall trapping in carabid research. However, few studies have compared the results obtained from pitfall traps with those of other methods. Forty-five paired pitfall traps and hand searching samples were obtained from nine habitats in Thetford Forest, Breckland, for comparison. With much less effort, pitfall traps produced over three times the number of individuals as hand searching, although both methods produced the same number of species. *Harpalus rufipalpis* Sturm, *Amara lunicollis* Schiödt and *Notiophilus aquaticus* L. were over-represented in pitfall traps. Overall, pitfall trapping preferentially captured larger species (≥ 8 mm) while hand searching resulted in more individuals of smaller species (< 8 mm). Despite these biases, both methods gave a qualitatively similar ordination of community composition across habitats.

Keywords: pitfall traps, hand searching, biases, activity-abundance, carabid assemblage

INTRODUCTION

Pitfall trapping has been one of the most extensively used methods for carabid research (Desender & Maelfait, 1986). It is low-cost, simple to carry out and relatively efficient at catching, so that it is possible to obtain a greater number of individuals with relatively less effort than other methods (Southwood & Henderson, 2000). As this group tends to show slow species rarefaction (i.e. even when many individuals have already been examined, catching a few more can still produce additional species), it is important to obtain sufficient material when studying species composition. Consequently, pitfall trapping has been widely adopted in studies of carabid abundance and assemblage composition (Thiele, 1977).

Despite the widespread acceptance of pitfall trapping in carabid research, there are a number of concerns regarding potential biases that can arise with this method. The catch efficiency of pitfall traps is influenced by other factors in addition to population size (Adis, 1979; Southwood & Henderson, 2000). The catch size of pitfall trapping is a function of both the density of the population and the activity of individuals (Briggs, 1960; Mitchell, 1963; Thiele, 1977). Greenslade (1964) showed that the size, behaviour and activity strata of different carabid species can all influence their trapability. Different species have different susceptibilities toward traps, and some 'investigative' behaviours (i.e. suspending over the edge of the trap with hind tarsi or walking down inside the trap and climbing out again) can affect capture rates (Hawthorne, 1994). Even within the same species, individual beetles which moved rapidly were more likely to be captured in laboratory experiments (Morrill *et al.*, 1990). Moreover, considering the behavioural change of species in response to microhabitat, the comparison of carabid faunas between habitats that

are structurally different based on pitfall trapping alone raises further concerns (Topping & Sunderland, 1992; Hawthorne, 1994; Andersen, 1995).

Details of the traps such as size, material and type of preservative or attractant, also influence capture efficiency (Luff, 1975; Benest, 1989; Holopainen, 1990; Morrill *et al.*, 1990; Spence & Niemelä, 1994; Work *et al.*, 2002). This can make it hard to compare results from different experiments and highlights the importance of standardising protocols within any one study.

Andersen (1995) stated that "Although pitfall traps have been used extensively in ecological field studies of carabid beetles, few studies have made direct comparisons between this method and absolute quantitative methods such as quadrat sampling". By a comparison of pitfall trapping and soil sampling, Briggs (1960) discovered a strong relationship between temperature and catching rates of *Harpalus rufipes* De Geer and *Feronia melanaria* Illiger and suggested that the increase of locomotor activity of beetles with increasing temperature was the main determining factor of the pitfall trapping result. Spence & Niemelä (1994) compared samples taken from pitfall trapping and a litter-washing technique and found pitfall samples yielded mostly large-sized beetles. By comparing the results from mark-release-recapture to those from pitfall trapping, Hawthorne (1994) concluded pitfall trapping was useful for the comparison of individual species abundance between habitats as long as the species behaviour did not differ significantly in response to habitat differences.

In this study, the relative abundance of species collected by pitfall trapping was compared with the absolute density estimated by hand searching. Samples were taken from different habitat structures in Thetford Forest, Breckland, to see if microhabitat influenced both methods similarly. Results are discussed in relation to possible biases and the usage of both methods.

METHODS

Pitfall trapping and hand searching were carried out in June, 2002 in nine locations within Thetford Forest, a lowland managed coniferous forest located in Breckland, eastern England (TL 7882). Sampling was carried out in six recently re-planted clearfelled stands (planting year ranging from 1997 to 2002), one felled but unplanted stand (felled trees removed but ploughing of planting rows had not yet been carried out, referred to as planting year 2003), one ride margin supporting heathland-like vegetation (ride margin), and one stand with 54 year-old trees (mature forest stand).

At each of the nine sampling locations, five pitfall traps were placed about 30 metres apart along a single line transect. Pitfall traps were 7.5 cm in depth, 6.5 cm in diameter transparent plastic cups containing 50 ml of ethylene glycol. Each trap was kept separately when collecting, however for analysis, results of each transect were pooled to represent each habitat. Pitfall traps were set up between 21 and 25 June, 2002 and collected five days later. The mean (\pm SD) maximum temperature measured from eight of the stands (no measurement was taken from the planting year 2000 stand) during this sampling period was $30.5 \pm 1.8^\circ\text{C}$ and the minimum temperature was $0.75 \pm 3.3^\circ\text{C}$. The large diurnal range and low minimum temperature are not atypical for Breckland, which is famous as a semi-continental region of Britain where frosts may occur in any month of the year.

Hand searching was conducted about two metres from each pitfall trap. Searching was carried out within a 100 cm long, 80 cm wide and 30 cm high hardwood frame, placed to prevent beetles from escaping during the hand searching period. All ground vegetation, debris and the upper few centimetres of sand were removed and searched destructively in order to obtain all the carabids within each quadrat. Quadrat

samples from each transect were pooled for comparison with those from pitfall traps. To reduce the bias caused by temporal dynamics, hand searching was carried out the day after pitfall traps were collected. Seven of the nine transects were hand-searched during daytime on 29 June, 2002, ride margin and mature forest stands were done the following day. Carabids were identified to species mainly according to Lindroth (1974) with nomenclature updated following Luff & Duff (2002).

Chi-square tests were used to compare the size spectra of captured carabids between the two methods. The species composition of different habitats was analysed by ordination, using correspondence analysis conducted in CANOCO for Windows 4.5 (ter Braak & Smilauer, 1997). Due to low numbers of individuals captured in each stand, samples taken from clear-fells of similar planting years were pooled prior to correspondence analysis. Correspondence analysis was therefore conducted on five pooled pitfall samples and their corresponding five hand searched samples. The relative position within the ordinations, of samples obtained from different habitats and by different methods (pitfall vs. hand searching) was compared by paired *t*-tests. As very few individuals were caught by either method in the plant-year 2002 stand, data from this stand have not been included in correspondence analysis, but are included in tables of total catches. Independent-samples *t*-tests were applied to test the size tendency in correspondence analysis graphs.

RESULTS

In total, 236 individuals of twenty-three species were caught by hand searching and pitfall trapping. Twelve species were found by both methods and eleven species were only found by one or other method. Pitfall trapping collected 188 individuals and 19 species, while hand searching produced fewer individuals (48) but only three species less.

The numbers of individuals of each species caught by the two methods are shown arranged by body size in Tables 1 and 2. *Harpalus rufipalpis* Sturm was the most abundant species caught by either method, however, its relative frequency was

Table 1. The total numbers of individuals caught by hand searching and pitfall trapping for each species less than 8 mm in length. Species are arranged in increasing size order, according to Joy (1932).

Species	Hand searching	Pitfall trapping	Size (mm)
<i>Syntomus foveatus</i> Fourcroy (*)	4	5	2.5–3.5
<i>Bradycellus harpalinus</i> Audinet-Serville	2	0	3
<i>Bembidion lampros</i> Herbst	0	1	3
<i>Notiophilus biguttatus</i> F.	2	2	3.5–5.5
<i>Notiophilus aquaticus</i> L.	1	13	3.5–5.5
<i>Amara tibialis</i> Paykull	9	6	4.5–5
<i>Olishopus rotundatus</i> Paykull (*)	1	0	6–7
<i>Amara convexior</i> Stephens (*)	1	1	7–7.5
<i>Amara lunicollis</i> Schiödte	4	14	7–8
<i>Amara aenea</i> De Geer	1	0	6–8
Total number of species	9	7	
Total number of individuals	25	42	

(*) species with British distribution mainly restricted to Breckland, according to Collier (1995) and Luff (pers. com.).

Table 2. The total numbers of individuals caught by hand searching and pitfall trapping for each species greater than 8 mm in length. Species are arranged in increasing size order, according to Joy (1932).

Species	Hand searching	Pitfall trapping	Size (mm)
<i>Harpalus rufipalpis</i> Sturm (*)	15	117	8–10
<i>Pterostichus quadrimaculatus</i> Letzner (Nb)	3	5	8–10.5
<i>Harpalus rubripes</i> Duftschmid	1	1	8–11
<i>Harpalus latus</i> L.	1	1	8–11
<i>Poecilus versicolor</i> Sturm	0	1	8–11.5
<i>Harpalus tardus</i> Panzer	1	5	9–11
<i>Harpalus smaragdinus</i> Duftschmid (Nb*)	0	4	9–11
<i>Harpalus affinis</i> Schrank (*)	1	4	9–12
<i>Calathus ambiguus</i> Paykull (Nb)	1	0	10–13
<i>Cicindela campestris</i> L.	0	1	10.5–14.5
<i>Harpalus rufipes</i> De Geer	0	1	14–16
<i>Carabus nemoralis</i> Müller	0	2	18–28
<i>Carabus problematicus</i> Herbst	0	4	20–30
Total number of species	7	12	
Total number of individuals	23	146	

(Nb) Nationally Scarce B species; (*) species with British distribution mainly restricted to Breckland, according to Collier (1995) and Luff (pers. com.).

significantly greater in pitfall than in hand searching samples (62% and 31% of the total number of individuals caught by pitfall traps and hand searching: d.f. = 1, $\chi^2 = 13.7$, $P < 0.001$). Individuals of larger species (≥ 8 mm) formed the major proportion of the total catch in pitfall samples (146 larger compared with 42 smaller), in contrast, larger species contributed just less than half of the catch in hand searching samples (23 larger, 25 smaller). This size bias between the two methods was highly significant when considering the total catch (d.f. = 1, $\chi^2 = 15.2$, $P < 0.001$), however, when *H. rufipalpis* was excluded, the size bias between pitfall sampling and hand searching was non-significant (d.f. = 1, $\chi^2 = 2.0$, $P = 0.154$).

Of those species that were smaller than 8 mm (shown in Table 1), three out of nine were only found in hand searching samples, while only one species *Bembidion lampros* Herbst was found solely in pitfall traps. More individuals of *Amara tibialis* Paykull were found in hand searching than by pitfall trapping. The abundance of *Notiophilus aquaticus* L. and *Amara lunicollis* Schiödt collected by pitfall trapping was much higher than that by hand searching, with these species represented in five and eight out of the total of 45 pitfall traps, respectively.

Of the species larger than 8 mm (shown in Table 2), six out of thirteen species were only caught by pitfall trapping and only one species, *Calathus ambiguus* Paykull, was found by hand searching but not in pitfall traps. For all other larger species except for *C. ambiguus*, numbers obtained by pitfall traps were at least equal to or greater than those obtained by hand searching.

Figure 1 showed the sample of ordination in the correspondence analysis. The general pattern of habitat association in relation to the primary ordination axis was similar for the two different methods, with samples from the mature forest habitat having a markedly different species composition and occurring to the right on axis 1, and clear-fell and ride margin samples occurring towards the left. However, samples obtained by the two different methods were separated on axis 2, with hand-search

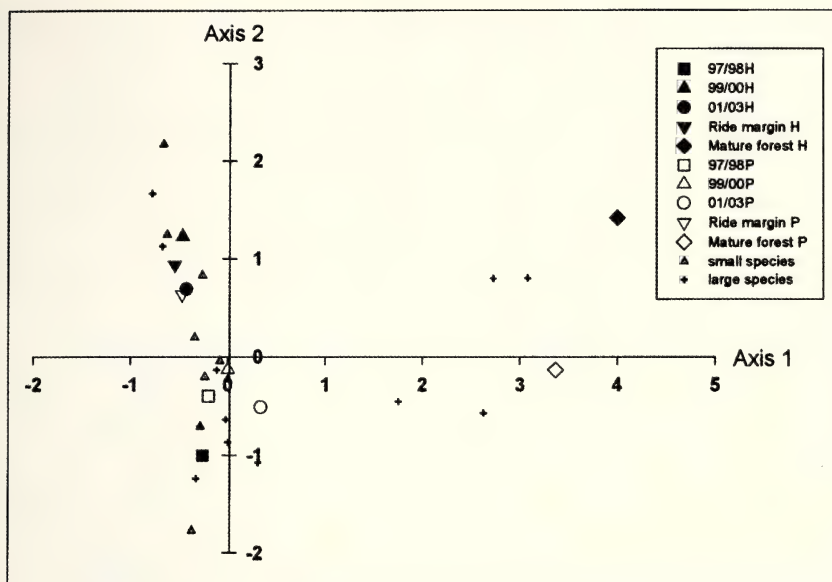


Fig. 1. Correspondence analysis of carabid composition in samples collected by hand searching and pitfall trapping with species. The first axis explained 25% of the total species variance, with axis 2 explaining an additional 16%. Numbers refer to plant years of pooled clear-fell samples. For example, 97/98 refers to a pooled sample of individuals taken from stands with planting years 1997 and 1998. H: samples taken by hand searching; P: samples taken by pitfall trapping. Beetle species were categorised as either small (<8 mm) or large (≥ 8 mm).

samples tending to be located above respective pitfall samples obtained from the same habitat (with the exception of pooled samples from 1997/98 planting years which showed the opposite trend). Carabid composition of composite samples collected from the same habitats did not differ between the two methods on axis 1 (mean \pm SD for hand searching = 0.46 ± 1.98 ; for pitfall trapping = 0.61 ± 1.57 ; paired t -test: d.f. = 4, $t = -0.623$, $P = 0.567$), or on axis 2 (mean \pm SD for hand searching = 0.65 ± 0.97 ; for pitfall trapping = -0.11 ± 0.45 ; paired t -test: d.f. = 4, $t = 1.89$, $P = 0.132$).

Most of the small-sized species were located at the mid to upper part of axis 2, with the exception of *Amara aenea* De Geer. In contrast, larger species tended towards the lower part of the ordination, with the exception of *C. ambiguus* and *Cicindela campestris* L. However, overall, larger and smaller species did not differ significantly in their location on axis 2 (mean \pm SD for smaller species = 0.37 ± 1.25 ; for larger species = -0.15 ± 0.93 ; d.f. = 21: $t = 1.44$, $P = 0.265$). The four species near mature forest samples were *Carabus problematicus* Herbst, *Carabus nemolaris* Müller, *Harpalus latus* L. and *Pterostichus quadrifoveolatus* Letzner. They were all found in mature forest samples, by either one or both methods.

Figure 2 showed the results of correspondence analysis with *H. rufipalpis* excluded. By comparing Figures 1 and 2, the distance between the mature forest samples and those from clear-fell habitats was reduced. Most of the smaller species were located from the mid to the right hand side of the ordination compared with the larger

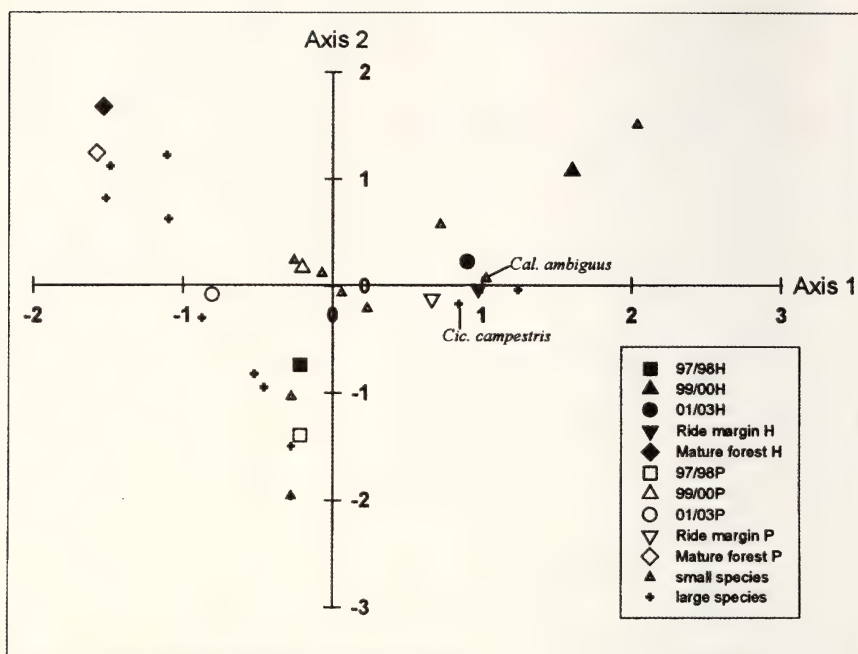


Fig. 2. Correspondence analysis of carabid composition in samples collected by hand searching and pitfall trapping, performed on species matrix excluding *Harpalus rufipalpis*. Beetle species were categorised as either small (<8 mm) or large (≥8 mm). The first axis explained 21.4% of the total species variance, with axis 2 explaining an additional 17.6%. Explanations of legends see Fig. 1.

species which were located to the left, with the exception of *C. ambiguus* and *C. campestris*. The difference in location of species from the two carabid size groups was significant (axis 1 scores, mean \pm SD for smaller species = 0.52 ± 0.91 ; for larger species = -0.48 ± 0.85 ; d.f. = 20; $t = 2.69$, $P = 0.014$). Similarly, hand searching samples were located to the right of their respective pitfall samples. This trend was not so obvious in 1997/98 samples, but they were not as exceptional as the pattern shown in Figure 1. The carabid composition obtained by the two different methods showed no significant differences on axis 1 (mean \pm SD for hand searching = 0.35 ± 1.24 ; for pitfall trapping = -0.43 ± 0.83 ; paired t -test: d.f. = 4, $t = 1.91$, $P = 0.128$), but this difference was significant on axis 2 (mean \pm SD for hand searching = 0.44 ± 0.95 ; pitfall trapping = -0.04 ± 0.94 ; paired t -test: d.f. = 4, $t = 3.43$, $P = 0.027$).

DISCUSSION

In total, twenty-three species were caught in this study, representing 31% of the known Thetford Forest carabid fauna (Y. C. Lin, unpublished data). Among the 23 species, three are categorised as Nationally Scarce B: *P. quadrioveolatus*, *Harpalus smaragdinus* Duftschmid and *C. ambiguus* (Hyman & Parsons, 1992) and six, including *H. smaragdinus*, have their UK distribution restricted to the Breckland

(Tables 1 and 2). These eight species are all associated with heathland or sandy habitats, though some also occur in other habitats, such as *P. quadriveolatus* which occurs in woodland, and *H. smaragdinus* which favours arable fields (Luff, 1998). Other sandy, heathland or moorland affiliates found in this study include *C. campestris* (Field Tiger Beetle), *A. tibialis* and *N. aquaticus*. The Breckland region has long been known to support scarce species of disturbed and sandy habitats, including species normally associated with coastal dunes (Morley, 1908; Telfer & Eversham, 1996). However, the once extensive heathland of Breckland has been greatly reduced by coniferous afforestation and conversion to arable fields (Dolman & Sutherland, 1992) and the persistence of scarce sandy and heathland species in the converted areas needs further investigation.

The effort of taking hand searching samples is greater than that of pitfall trapping, however, a greater volume of material was obtained by pitfall sampling. The hand searching samples took a total of 40 people-hours, while pitfall samples were collected by one person in six hours. Despite the markedly lower sampling effort, the pitfall traps provided more than three times the number of individuals obtained by hand searching. This advantage of pitfall trapping explains why it is one of the most frequently used sampling methods in research on carabids (Thiele, 1977; Desender & Maelfait, 1986).

There was a tendency for pitfall samples to be dominated by larger species. This size bias was non-significant when the total catch was considered after exclusion of *H. rufipalpis* (χ^2 -test). However, when the species composition in different habitats was considered, the location of samples obtained by the two methods differed significantly (*t*-test on axis 2 scores in Fig. 2). A similar phenomenon has also been observed by other researchers. Arneberg & Andersen (2003) found the slopes of size-abundance relationships using data from pitfall traps were significantly more positive than those from hand searching. By comparing samples taken from litter washings, Spence & Niemelä (1994) also found pitfall trap catches to be biased toward larger carabids. A number of possible explanations for the apparent bias can be considered. Firstly, although hand searching was intended as a true measure of absolute density, large nocturnal burrow-forming carabids may be under-represented in diurnal samples compared with their true abundance in a particular habitat. Secondly, larger carabid species may be more active than smaller ones and therefore more likely to be caught in pitfall traps (Spence & Niemelä, 1994). For example, large carnivorous carabids such as *Carabus* spp. tend to move more because their food resource is more scattered (Andersen, 1995). Finally, the smaller carabid species may be capable of entering, but then climbing out of pitfall traps (Hawthorne, 1994). Although smaller carabid species tended to be relatively less abundant in pitfall samples compared with hand searching samples, two smaller species, *A. lunicollis* and *N. aquaticus* were much more common in pitfall than handsearch samples. It is possible that these two species were preferentially captured due to a behavioural response to the glycol preservative.

The high representation of *H. rufipalpis* in pitfall compared to hand searching samples, was a major factor contributing to the size bias in pitfall trapping. Over-representation of certain species has also been found in previous research. Desender & Maelfait (1986) suggested the overestimation of some observed species (*Bembidion properans* Stephens, *B. lampros*, *Loricera pilicornis* F. and *A. aenea*) was due to their high mobility and active hunting during daytime. Andersen (1995) found that *Bembidion schuppelii* Dejean was over-represented in sub-optimal microhabitats, which was in accordance with the results of Grüm (1971) who found that the activity of satiated individuals was higher in sub-optimal than in optimal habitats (Andersen, 1995).

The species composition of pitfall samples was dominated by *H. rufipalpis*, and the ordination gave a qualitatively different result when this species was excluded. With *H. rufipalpis* included, the primary correspondence analysis axis represents a marked contrast between mature forest and all other habitats, while the contrast between sampling methods was reflected on the secondary correspondence analysis axis (Fig. 1). Excluding *H. rufipalpis*, although the location of the mature forest samples still contrasted with that of the other habitats, this dichotomy was less extreme. This might be due mainly to the absence of *H. rufipalpis* in mature forest samples and with this species excluded, the differences between samples obtained by the two methods were apparent on the primary correspondence analysis axis (Fig. 2). Despite this, the community structure revealed by the ordinations was broadly similar for both methods. This shows that the differences in carabid compositions taken from extremely different habitat structures (mature forest vs. open clear-felled and re-stocked habitats and ride margins) was revealed by both sampling methods. However, the two methods differed in the manner in which they represented carabid species composition between samples taken from structurally similar habitats. The correspondence analysis composition of carabid samples collected by these two methods did not differ significantly when *H. rufipalpis* was included, but the difference on axis 2 was close to significant. After the exclusion of this species, axis 2 scores of samples obtained by the two methods differed significantly.

To conclude, the popularity of pitfall trapping is easily understood by its much greater catching rate compared with hand searching. For the relative composition of the carabid assemblage in different habitats, the major pattern of results gained from pitfall trapping reflected those from hand searching, but some differential biases of the two methods remain apparent. The tendency to catch larger species in pitfall traps and the over-representation of some species such as *N. aquaticus*, *A. hunicollis* and *H. rufipalpis*, re-emphasise the need for caution in the interpretation of community composition from pitfall results.

ACKNOWLEDGEMENTS

The authors would like to thank Mark Telfer (RSPB) for advice, also Han-I Chao, Amy Eycott, Yi-Yuan Hwang, Tan-Li Hwang and Yi-Ying Lee (UEA) for helping with field work.

REFERENCES

- Adis, J. 1979. Problems of interpreting arthropod sampling with pitfall traps. *Zoologischer Anzeiger* **202**: 177–184.
- Andersen, J. 1995. A comparison of pitfall trapping and quadrat sampling of Carabidae (Coleoptera) on river banks. *Entomologica Fennica* **6**: 65–77.
- Arneberg, P. & Andersen, J. 2003. The energetic equivalence rule rejected because of a potentially common sampling error: evidence from carabid beetles. *Oikos* **101**: 367–375.
- Benest, G. 1989. The sampling of a carabid community: II. Traps and trapping. *Revue d'Écologie et de Biologie du Sol* **26**: 505–514.
- Briggs, J. B. 1960. A comparison of pitfall trapping and soil sampling in assessing populations of two species of ground beetles (Col.: Carabidae). *Annual Report of the East Malling Research Station for 1960*, pp. 108–112.
- Collier, M. 1995. The effectiveness of five land management regimes on the regeneration of grassland heath in the Norfolk Breck, as indicated by the carabid (ground beetle) fauna. Unpublished report. Forest Enterprise, Brandon.

- Desender, K. & Maelfait, J. P. 1986. Pitfall trapping within enclosures—a method for estimating the relationship between the abundances of coexisting carabid species (Coleoptera: Carabidae). *Holarctic Ecology* 9: 245–250.
- Dolman, P. M. & Sutherland, W. J. 1992. The ecological changes of Breckland grass heaths and the consequences of management. *Journal of Applied Ecology* 29: 402–413.
- Greenslade, P. J. M. 1964. Pitfall trapping as a method for studying populations of Carabidae (Coleoptera). *Journal of Animal Ecology* 33: 301–310.
- Grüm, L. 1971. Spatial differentiation of the *Carabus* L. (Carabidae, Coleoptera) mobility. *Ekologia Polska* 19: 1–34.
- Hawthorne, A. J. 1994. *Variation in the distribution of carabid beetles in cereal field headlands*. PhD thesis, University of East Anglia, Norwich, UK.
- Holopainen, J. K. 1990. Influence of ethylene glycol on the numbers of carabids and other soil arthropods caught in pitfall traps. *The Role of Ground Beetles in Ecological and Environmental Studies*, Stork, N. E. (Ed.), pp. 339–341. Intercept, Andover.
- Hyman, P. S. & Parsons, M. 1992. *A Review of the Scarce and Threatened Coleoptera of Great Britain. Part 1*. Joint Nature Conservation Committee, Peterborough.
- Joy, N. H. 1932. *A Practical Handbook of British Beetles*. H. F. and G. Witherby, London.
- Lindroth, C. H. 1974. *Handbooks for the Identification of British Insects—Coleoptera, Carabidae*. Royal Entomological Society of London, London.
- Luff, M. L. 1975. Some features influencing the efficiency of pitfall traps. *Oecologia* 19: 345–357.
- Luff, M. L. 1998. *Provisional Atlas of the Ground Beetles (Coleoptera, Carabidae) of Britain*. Centre for Ecology and Hydrology, Huntingdon.
- Luff, M. L. & Duff, A. 2002. The Checklist of Carabidae in the Coleopterist. <http://www.coleopterist.org.uk/>_last update: 2-28-2002.
- Mitchell, B. 1963. Ecology of two carabid beetles, *Bembidion lampros* (Herbst) and *Trechus quadristriatus* (Schränk). II. Studies on populations of adults in the field, with special reference to the techniques of pitfall trapping. *Journal of Animal Ecology* 32: 377–392.
- Morley, C. 1908. The insects of the Breck. *Transactions of the Norfolk and Norwich Naturalists' Society* 579–586.
- Morrill, W. L., Lester, D. G. & Wrona, A. E. 1990. Factors affecting efficacy of pitfall traps for beetles Coleoptera: Carabidae and Tenebrionidae. *Journal of Entomological Science* 25: 284–293.
- Southwood, T. R. E. & Henderson, P. A. 2000. *Ecological Methods*, 3rd ed. Blackwell Science, Oxford.
- Spence, J. R. & Niemelä, J. K. 1994. Sampling carabid assemblages with pitfall traps—the madness and the method. *Canadian Entomologist* 126: 881–894.
- Telfer, M. G. & Eversham, B. C. 1996. Ecology and conservation of heathland Carabidae in eastern England. *Annales Zoologici Fennici* 33: 133–138.
- ter Braak, J. C. F. & Smilauer, P. 1997. CANOCO for Windows 4.5. Plant Research International, Wageningen.
- Thiele, H. U. 1977. *Carabid Beetles in Their Environment—A Study on Habitat Selection by Adaptations in Physiology and Behaviour*. Springer-Verlag, Berlin.
- Topping, C. J. & Sunderland, K. D. 1992. Limitations to the use of pitfall traps in ecological studies exemplified by a study of spiders in a field of winter-wheat. *Journal of Applied Ecology* 29: 485–491.
- Work, T. T., Buddle, C. M., Korinus, L. M. & Spence, J. R. 2002. Pitfall trap size and capture of three taxa of litter-dwelling arthropods: implications for biodiversity studies. *Environmental Entomology* 31: 438–448.

PLANNING A NEW NATIONAL MACRO-MOTH RECORDING SCHEME

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INTRODUCTION

Thanks to the expertise and dedication of amateur naturalists, the level of knowledge of the distribution, population levels and conservation status of Britain's fauna and flora is unique. No other country benefits from such an in-depth understanding of its natural heritage. For the best-worked groups, objective measures of change over time can be calculated from repeated, comprehensive distribution surveys and population monitoring. This knowledge is the essential foundation for almost all aspects of nature conservation at a time of widespread declines in biodiversity. Furthermore, the data generated by recording can be used for many other purposes, such as assessing the impacts of climate change, identifying shifts in phenology and voltinism, and raising awareness and appreciation of wildlife amongst the general public.

Vascular plants, birds and butterflies are sufficiently well worked to provide trend and status information. Indeed, repeated national surveys of these three groups have afforded the first opportunity to compare country-scale trends in an invertebrate group (i.e. butterflies) with those of vascular plants and birds (Thomas *et al.*, 2004). In addition to these three main groups, there is good knowledge of population or distribution trends in mammals and certain (often rare) species in other taxa. However, for the vast majority of British species knowledge of distribution and changing status is lacking. Insects make up the largest portion of UK biodiversity (Department of the Environment, 1994) and so to adequately assess changes to our biodiversity, it is vital that information is available for at least one, species-rich and ecologically diverse insect group. We believe that the Lepidoptera are particularly well suited for this purpose. This paper reports on the findings of a year-long planning and consultation project carried out by a partnership of organisations led by Butterfly Conservation and designed to pave the way towards a national recording scheme for macro-moths.

WHY MACRO-MOTHS?

Some 2500 species of Lepidoptera have been recorded in Britain so far (the precise number varying according to source), so the group clearly meets the criteria of being species-rich. Lepidoptera are also ecologically diverse and might be expected to be good indicators of change in most terrestrial biotopes. At the ecosystem level, moths are significant herbivores and pollinators, as well as hosts for numerous hymenopteran and dipteran parasitoids and important prey items for many predators, including birds (see review by Glen, 2004) and bats (see review by Vaughan, 1997).

Questions of the suitability of most insect groups pale almost into insignificance when compared with those of feasibility. To generate information on trends in abundance or distribution, comprehensive recording and monitoring is needed and there are simply too few recorders to achieve this for all of the species-rich insect taxa at present, with the exception of the Lepidoptera.

There are already comprehensive distribution surveys of butterflies, organised by the national recording scheme, Butterflies for the New Millennium (Asher *et al.*, 2001), and population monitoring transects at over 500 sites (Brereton & Stewart, 2003). There are also four active national recording schemes for groups of micro-moths (covering the Incurvarioidea, Pyralidae and Pterophoridae, Gelechiidae and six small families, and the leaf miners). Together these four schemes represent over half of the 1600 micro-moth species in Britain (N. Greatorex-Davies pers. comm.). However, the 800 or so species of macro-moths, which make up the remainder of the Lepidoptera, are not covered by a national recording scheme at present, although the National Scarce Moth Recording Scheme has operated since 1991, collating records of Red Data Book and Nationally Scarce macro-moths across the UK. This scheme is co-ordinated by Butterfly Conservation with financial support from the Joint Nature Conservation Committee. Despite the absence of a national recording scheme covering all macro-moths, there is clear potential to produce comprehensive trend information about this significant group of insects for the following reasons:

- Macro-moths are popular with amateur entomologists and natural history recorders
- Moths and moth recording appear to be growing rapidly in popularity
- Much recording effort is already taking place at site and county levels
- There is an existing network of county moth recorders, each collating records for their area and many maintaining computer databases
- Many local moth groups have been set up to encourage recording, study and enjoyment of moths
- A growing number of popular journals, magazines, newsletters, web sites and internet discussion sites cover macro-moths
- Good identification guides exist for the group
- Many organisations run training events for macro-moth recording and identification
- Moth traps and other useful equipment are readily available
- Many counties have a published macro-moth list or distribution atlas
- There is a long history of macro-moth recording in Britain and much historical distribution data could be collated from various sources (e.g. computerised records, publications, collections etc.)
- Considerable knowledge exists as to the taxonomic status and ecology of macro-moths, and there is much active research
- Many moth recorders are now computerising their sightings due to good, affordable recording software.

With the addition of data on macro-moths from a new national recording scheme, there would be potential to examine status and trends from some 1700 of the 2500 Lepidoptera species in Britain. This would really start to redress the bias towards vascular plants and vertebrates that exists in nature conservation policy and practice, and improve the public perception of moths!

There is yet another good reason to attempt to set up a national macro-moth recording scheme: there is already a national monitoring network for macro-moths, in the form of the Rothamsted Insect Survey (Woiwod & Harrington, 1994). Since

1968, standard Rothamsted-design light traps have operated at a total of over 430 sites throughout Britain, with a mean of 83 sites operating per year. National distribution data from a new national macro-moth recording scheme (NMRS) would greatly complement such population monitoring. Together the two schemes would provide reliable assessments of changing conservation status, phenology and the impact of climate change (as has been achieved for butterflies; Asher *et al.*, 2001). Recent analysis of 35-year population trends from the Rothamsted Insect Survey for 338 species of common macro-moth has shown that 54% had declined in abundance, whilst 22% had increased (the remaining 24% being stable) (Conrad *et al.*, 2004). Convincing evidence of such widespread declines provides an increased sense of urgency for national distribution recording of macro-moths, for without knowledge of their distribution any attempts to conserve rare or common moths will likely be futile.

THE PLANNING AND CONSULTATION PROJECT

The increasing need for a national macro-moth recording scheme (NMRS) led to discussions over recent years between Butterfly Conservation and a number of other organisations. By May 2003, a strong partnership had been built and sufficient funding obtained in order to commence a thorough consultation, planning and development project aimed towards the implementation of a new NMRS in Britain. The core partners included the Biological Records Centre, the British Entomological and Natural History Society (BENHS), Butterfly Conservation, English Nature, Joint Nature Conservation Committee, Rothamsted Research and representatives of the volunteer moth recording community. Many other organisations expressed their support. The Heritage Lottery Fund provided much of the funding for the planning project, with additional funds donated by some of the partners as well as the Biodiversity Challenge Group and the Royal Society for the Protection of Birds (RSPB). Adrian Spalding and Mark Tunmore, working under the umbrella of Spalding Associates (Environmental) Ltd. were employed to take on the project, working with Butterfly Conservation staff and under the guidance of a project steering group.

The main aims of the planning project were to:

- consult moth recorders and the wider biological recording and nature conservation community and engage them in the development of the proposed NMRS
- gauge and build support for the proposed scheme
- assess current recording capacity and existing data sets
- develop the aims and objectives of the proposed NMRS
- identify potential sources of moth records and effective routes for data flow
- consider survey methodologies, data verification and access issues
- assess computer options, health and safety and insurance issues
- arrange and evaluate a series of moth identification and recording workshops
- develop proposals for recorder training and accreditation
- suggest ways to increase numbers of moth recorders and remove barriers to participation
- provide recommendations to form the backbone of the proposed NMRS.

The planning project took just over a year to complete and its findings were compiled into a report (Spalding & Tunmore, 2004). This paper provides the first published review of these findings.

THE CONSULTATION

The success of a national macro-moth recording scheme would depend on the support of the existing moth recording community. All of the project partners felt that it was vital that individual recorders and relevant organisations were given chances to voice their opinions and be involved in planning at the earliest possible stage and before any key decisions were made. The only decision made prior to the consultation process was that the scheme would be restricted to macro-moths. Therefore, an extensive consultation with existing moth recorders, entomological societies and moth groups, as well as nature conservation and biological recording organisations, formed the central theme of the planning project. The consultation would also yield information to address the other aims of the planning project, such as assessing current recording activity.

The consultation involved three discrete phases:

1. Publicity for the planning project, which was achieved through a project leaflet and web site (www.mothrecording.org.uk), announcements in the entomological journals and presentations at public events.
2. Questionnaires to the moth recording community and to the county moth recorders. The detailed results of these two questionnaires will be covered elsewhere (Spalding *et al.*, 2005 and Tunmore *et al.*, in prep.).
3. Discussion meetings, which included three national conferences (at Perth, Swansea and Warwick), three seminars (with the British Entomological and Natural History Society, the British Trust for Ornithology and moth recorders in North Wales), several smaller meetings with moth recorders, and meetings with a wide range of nature conservation and biological recording organisations.

The consultation was extremely thorough and successful. Six thousand five hundred copies of the project leaflet and questionnaire were distributed and 1032 completed questionnaires were returned (both via the project web site and by way of the leaflet/questionnaire). In addition, 68% of county moth recorders responded to the separate, detailed questionnaire sent to them. Over 200 people attended the three national conferences, which proved both popular and very enjoyable, and 32 different organisations were consulted during the planning project, including the three statutory nature conservation agencies, local records centres and museums, research organisations and nature conservation charities.

Thanks to the high level of response to the questionnaires and the support of recorders and organisations at meetings, the consultation provided an enormous amount of detailed information to inform the planning project, along with suggestions and concerns to guide the development of the proposed NMRS, and a unique insight into the current status of moth recording in Britain.

The most important finding of the consultation was that there is widespread support for the development of a national macro-moth recording scheme. Over 97% of respondents to the main project questionnaire and 100% of the respondents to the county recorders questionnaire were broadly supportive of the concept.

THE CURRENT SITUATION IN MACRO-MOTH RECORDING: RECORDING CAPACITY AND EXISTING DATA SETS

People have been collecting and writing about moths for at least 300 years, but early accounts of species distributions tended to be restricted to the London area (Young, 1997). During the Victorian era the great upsurge of interest in natural

history led to the first generalised distributions for macro-moths throughout Britain. However, no systematic national recording of macro-moths existed until 1967, when John Heath organised a recording scheme for Lepidoptera at the Biological Records Centre (BRC) by appointing recorders for each county. Standard recording cards were distributed, training arranged for recorders and a number of leaflets were published which described the key identification features of critical species. The scheme ran until John Heath's retirement in 1982, at which time there was not sufficient funding to continue it and the scheme came to an end. During the scheme over 50,000 record cards were amassed and these are still held at BRC (P. Harding pers. comm.). Distribution maps for some macro-moth species were published in *The moths and butterflies of Great Britain and Ireland* series and other provisional maps were made available to recorders. The original record cards and other paper archives held at BRC would provide a good source of historical records for macro-moths, but would require verification and computer input.

Since the end of the BRC scheme in 1982, there has been no centralised system for collecting macro-moth records (other than those of Red Data Book or Nationally Scarce moths). The main repository of moth records is the county recorder network. However, a wide range of other organisations hold moth records, including local record centres, conservation organisations (e.g the Wildlife Trusts and RSPB), local natural history societies, museums, local moth groups and Butterfly Conservation branches. A significant proportion of records reside only with the original recorder (see below).

Despite the disparate nature of macro-moth recording over recent decades, there has been a huge increase in activity. The growth of local moth groups and publication of many county lists and atlases is evidence of this increase in recording. As part of the planning and consultation project, we attempted to quantify the increase by assessing the numbers of macro-moth records held by county recorders (Spalding & Tunmore, 2004). In almost all cases, there are many more records in recent years than previously. Figure 1 shows the scale of this recent increase in moth recording in selected counties. In another example, 63% of the total moth records held by the county recorder for South Lancashire (VC 59) are for the years 2000–2003 (C. Darbyshire, pers. comm.). The picture is similar for West Lancashire (VC 60) with 61% (C. Darbyshire, pers. comm.). Although these trends are widespread across Britain (two-thirds of county recorders who returned the detailed questionnaire felt that the number of records they receive is increasing each year), they are not replicated in all counties; for example, macro-moth records for Herefordshire have shown a slight decrease after a peak in the early 1990s.

HOW MANY MOTH RECORDS ARE THERE?

The consultation with county moth recorders provided information to estimate the number of moth records already in the network. Thirty-two counties provided estimates of their holdings, which ranged from 3000–500,000 records (Spalding & Tunmore, 2004). In total, these 32 county recorders hold over 3 million moth records. There are 61 county recorders covering Britain, so a rough estimate of the total holding would be 6.3 million records. In addition to this are many records held by individual recorders, local records centres, the National Trust (some 30,000 moth records), RSPB and others, as well as the 50,000 record cards (containing an unknown number of records) archived at BRC. The Rothamsted Insect Survey data set consists of 10 million moth records. With the number of records increasing

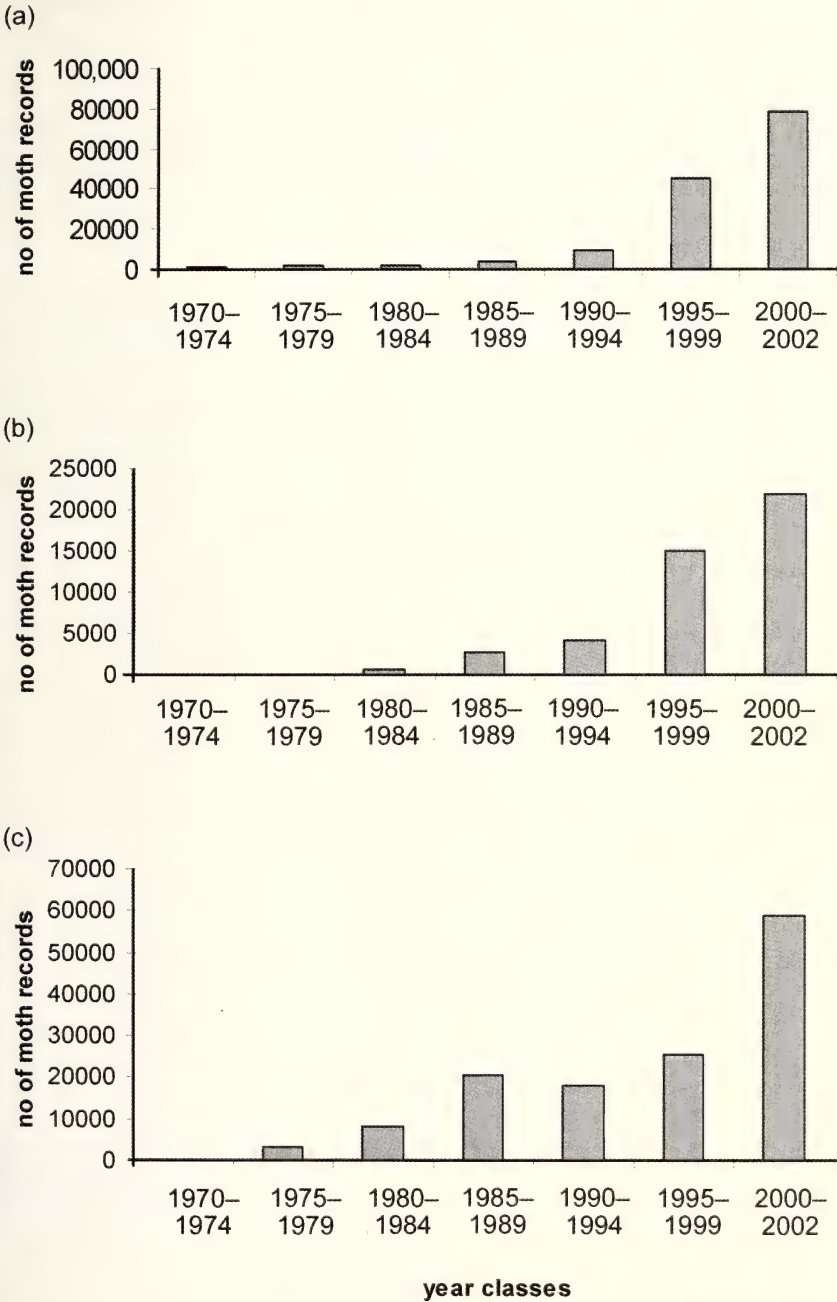


Figure 1. The numbers of macromoth records held by county recorders in selected areas of Britain, 1970–2002. (a) Suffolk, (b) Worcestershire, (c) Cheshire.

rapidly, a reasonable and conservative estimate of the total existing (but dispersed) data set would be c. 18 million records.

HOW MANY MOTH RECORDERS ARE THERE?

It is difficult to estimate the total number of active moth recorders in Britain today. This difficulty stems in part from the plethora of national and local organisations whose members have an interest in moth recording, in part from the lack of a national recording scheme and in part from a feeling that the number of recorders is increasing rapidly. The best estimate to date has been 'several thousands' (Fox, 2001).

However, the consultation undertaken as part of this project yielded some real data on which to base a minimum estimate. 1032 people responded to the planning project questionnaire, all of whom were either active moth recorders (91%) or just starting to record moths (9%). In addition, the county recorders' questionnaire provided data for 39 areas and an estimate of 1086 recorders who regularly submit records (Tunmore *et al.*, in prep.). Extrapolating up to the full county recorder network gives a figure of 1700 moth recorders. However, we also discovered that 22% of recorders who completed the main project questionnaire do not send their records to county recorders, so an extra 202 moth recorders can be added to the estimate.

The project questionnaires, therefore, suggest a minimum estimate of c. 2000 active macro-moth recorders in Britain at the present time. This is likely to be an underestimate. The main project questionnaire also supports the perception that the number of moth recorders is growing rapidly. Thirty-six per cent of respondents had been recording moths for less than four years (Spalding *et al.*, 2005).

Estimating the number of active macro-moth recorders is difficult enough, but attempting to quantify the potential for new recorders is even more so. Nevertheless, we believe this potential to be large. Many organisations run moth trapping evenings and workshops aimed at beginners and these have proved very popular. Eleven such workshops were organised as part of this planning project, and were attended by 206 people. Over 50% of beginners who attended these workshops expressed an interest in taking up moth recording (Spalding & Tunmore, 2004).

Analysis of data from Butterfly Conservation's Garden Butterflies Count project, which encouraged members of the public to record 22 species of butterflies and 4 macro-moths that are commonly seen in gardens, also supports this perception. In 2002, the first year of Garden Butterflies Count, 20% of the 11,000 participants recorded at least one of the macro-moth species. This rose to an astonishing 49% of 8,200 participants in 2003 (R. Fox, unpublished data). Whilst this increase was probably largely a result of high numbers of one of the four target species during 2003, the Humming-bird Hawk-moth *Macroglossum stellatarum* (L.) (Fox, 2004), the general findings of this 'citizen science' project and the popularity of moth trapping evenings and training events for beginners, suggest that there is indeed considerable potential to recruit new macro-moth recorders in the future. Such potential would be best developed within the infrastructure, publicity and support of a new national macro-moth recording scheme.

AIMS OF THE PROPOSED NMRS

Distribution records of macro-moths could be used in many different ways in nature conservation, development control, policy and legislation, research into

climate change and phenology, education and raising awareness. In the consultation questionnaire, moth recorders were asked for their views on what should be the main aims of the proposed NMRS. Most respondents felt that highlighting trends in moth populations and using records to help conservation were the most important aims. Approximately 80% of respondents highlighted these two aims respectively. Sixty-six per cent of respondents also expressed the view that the proposed NMRS should work towards the production of a national atlas of macro-moths over a period of years.

SOME KEY ELEMENTS OF A FUTURE NMRS

As a result of the extensive consultation, the planning project report makes 39 summary recommendations for the development of the proposed NMRS (Spalding & Tunmore, 2004). These will be reviewed by the project partners and developed into funding bids with the aim of setting up a recording scheme within the next two years. The recommendations can be viewed in full on the project web site (www.mothrecording.org.uk), but some of the key elements that will form the backbone of a future scheme are reviewed here.

As endorsed by clear majorities of recorders attending the three national conferences, the proposed NMRS should be run by a partnership of relevant organisations, led by Butterfly Conservation. This partnership would not be restricted to the organisations involved in this planning project.

The proposed NMRS should comprise a number of different activities. At its core would be a national recording scheme for all macro-moths, designed so that existing moth recorders can feed in their records easily, be aware of what will happen to their records and receive useful and interesting feedback. However, other activities would run in parallel to this core recording scheme, under the umbrella of the NMRS. These might include targeted surveys of threatened species and habitats, public participation surveys to raise awareness of moths and moth recording, and education projects with schools. In addition, the NMRS should form close links with existing recording projects such as National Moth Night (Tunmore, 2004).

The core recording scheme should be based upon the existing network of county moth recorders. Recorders would be encouraged to submit records via this network and the NMRS would provide support to county moth recorders as appropriate. However, alternative routes for data submission should also be considered to maximise participation in the scheme. Even in such cases, data should flow back to the appropriate county recorders for verification. The NMRS should seek to collate existing (recent and historical) moth records so that the changing status of macro-moth species can be assessed.

The reputation of the NMRS would depend on high standards of data quality and clear systems must be put in place to ensure adequate verification of records and validation of computerised data. Verification is a key issue for species-rich taxa such as macro-moths and presents a qualitatively different challenge compared to national recording of butterflies. Verification issues are discussed further in the following section.

The proposed NMRS must deliver practical benefits for moths (i.e. by supporting nature conservation efforts), but also for participating recorders. Feedback to recorders is an essential element of any successful recording scheme, and can be achieved through newsletters, meetings, web sites and articles in journals, as well as by working towards a national atlas. The NMRS would utilise all of these methods. However, discussions with recorders during the consultation suggested that the

NMRS could deliver great practical benefits by providing recorders with direct access to view the NMRS database (at an agreed level of geographical resolution) via the internet (e.g. via the National Biodiversity Network Gateway, www.searchnbn.net). As well as providing up-to-date feedback regarding recording coverage and poorly worked areas, such a facility could yield much of interest to recorders, for example the progress of species that are expanding their ranges, the macro-moth fauna already recorded from a particular area to help identify new 10 km or county records, by suggesting likely areas for recording scarcer species and by assisting with the determination of observed moths. An internet database might also be an efficient way to deliver the information needed by conservation agencies and partners in the Biodiversity Action Plan process.

Training of moth recorders, whether beginners or experienced recorders, should be an important part of the proposed NMRS. Training in moth identification, recording techniques, difficult groups, determining specimens, use of computer software and organising public events could all be part of the programme. Training will be a vital element in encouraging new moth recorders, particularly in areas of the country or sectors of the community in which there are currently few people interested in moths.

In addition to training programmes, elements should be developed within the proposed NMRS to specifically encourage beginners. For example, projects concentrating on easily identified and conspicuous macro-moths and/or their larvae would help overcome current barriers to involvement in moth recording created by ignorance, identification difficulties and dependence on expensive moth-trapping equipment. These projects could be supported by popular publicity, a range of visual aids such as colour identification charts, and web pages with photographs and distribution maps. As well as repeating the formulas of successful public participation projects such as Garden Butterflies Count, Big Garden Birdwatch and the Great Stag Hunt (for the Stag Beetle *Lucanus cervus* L.), the NMRS should seek to link in to other, more comprehensive initiatives aimed at increasing individual and community participation in environmental issues and decision making.

DIFFICULT ISSUES: VERIFICATION, OWNERSHIP AND ACCESS

Whilst there was great support for the proposed national macro-moth recording scheme throughout the planning and consultation project, concerns were raised consistently about certain issues. Verification, ownership, and access to records all provoked strong, often contrasting, reactions and must be addressed clearly by the proposed scheme. The planning project provided a lot of information on these issues and it will take time to formulate the best approach to take in the future. Here we present some initial thoughts on these complex and heartfelt issues.

Verification of records is essential and, ideally, the appropriate county moth recorder(s) would verify all NMRS data. However, in order to make the verification process as efficient as possible, the NMRS should, where necessary, aim to support county moth recorders and others by producing and publicising lists of critical species, encouraging accurate recording and developing national or regional verification panels to share the workload and responsibility. The scheme should promote the continuing importance of specimens, where appropriate, for accurate identification and hence nature conservation and research.

Moth recorders would retain ownership of their records and their legal rights (e.g. moral rights, intellectual property rights) over the way that their records can be used.

However, for the proposed NMRS to function, recorders would have to agree that the scheme could use their records in certain ways. The NMRS would try to make this clear and simple by publicising information about how records will be stored and used by the NMRS and providing feedback to recorders, showing how records are being put to use to benefit moths.

Access to records was another issue that generated much interest during the consultation. Opinions covered a wide spectrum of views from complete openness to severe restrictions on access to records. We recommend that all data entered into the recording scheme should be as fully available as possible to all for the advancement of knowledge and understanding of our native fauna and flora and its conservation. On the other hand, if making records available increases the risk of damage to populations or their habitats, then access may need to be controlled.

Clearly, there are risks to consider and balances to be struck. Not all users require access to records at the same level of detail (e.g. the general public might only have access to data at a 10 km square level) and the sensitivity of some records is greater than others for genuine reasons (e.g. a legal requirement by a landowner not to disclose records). The precise proposals have yet to be formulated, but it is certain that the new scheme should develop a clear data access policy, so that all recorders understand who else will be permitted access to their records once in the NMRS, and under what circumstances. Records must be accessible if they are to be used in nature conservation and in informing the planning process, but recorders have the right to know how their records will be used (and by whom) before they decide to contribute to the proposed national macro-moth recording scheme.

CONCLUSIONS AND NEXT STEPS

This planning project for a national macro-moth recording scheme has achieved many successes, including a very thorough consultation with the existing moth recording and nature conservation communities, high levels of publicity to raise awareness of the proposed scheme, and the collation of a vast array of views and information to inform the development of the proposed NMRS. The questionnaire produced the largest and most thorough survey of Britain's moth recording community.

There has never been a more opportune time to create a recording scheme for macro-moths. Many species appear to be in decline and over 20 are considered extinct, while others are colonising our islands or expanding their former ranges (Parsons, 2003). The number of active recorders and the quantity of records being generated and computerised are unprecedented and suggest that a comprehensive assessment of species' national distribution and distribution change may be achievable for all macro-moths for the first time. Such data could be used to greatly increase awareness and conservation of macro-moths, and provide the first rigorous assessment of the changing status of a species-rich invertebrate taxon, particularly when considered alongside population monitoring trends from the small number of Rothamsted Insect Survey sites.

Thanks to your support, we have a clear view of the main elements that will make up the proposed NMRS and will now seek funding with the aim of bringing it into existence. Securing the necessary funding will not be easy or quick. Furthermore, long-term security of funding is what the proposed NMRS will need; a significant challenge in today's financial climate. Nevertheless, with your help and the planning project we have done much already to pave the way for a national macro-moth recording scheme.

ACKNOWLEDGEMENTS

We would like to thank all of the moth recorders and many organisations who participated in the planning and consultation project for all their support and input. We are grateful to Tony Prichard, Tony Simpson, Steve McWilliam and Chris Darbyshire for providing analysis of the numbers of macro-moths they hold for their counties (used in Figure 1 and text). We wish to acknowledge the financial support of the Heritage Lottery Fund, English Nature, the British Entomological and Natural History Society, the Joint Nature Conservation Committee, Biodiversity Challenge and the Royal Society for the Protection of Birds, as well as help in kind from the National Biodiversity Network Networking Naturalists Project, Scottish Natural Heritage, BRISC, Warwick University, Cellcreative and many individuals, too numerous to list here. Finally, we thank all of the members of the project steering group for their support and guidance during the planning project.

REFERENCES

- Asher, J., Warren, M., Fox, R., Harding, P., Jeffcoate, G. & Jeffcoate, S. 2001. *The millennium atlas of butterflies in Britain and Ireland*. Oxford University Press, Oxford.
- Brereton, T. & Stewart, K. 2003. *Agri-environment schemes and butterflies newsletter July 2003*. Butterfly Conservation, Wareham.
- Conrad, K. F., Woiwod, I. P., Parsons, M., Fox, R. & Warren, M. 2004. Long-term population trends in widespread British moths. *Journal of Insect Conservation* **8**: 119–136.
- Department of the Environment. 1994. *Biodiversity, the UK action plan*. HMSO, London.
- Fox, R. 2001. Butterflies and moths. In *The changing wildlife of Great Britain and Ireland*, (ed. D.L. Hawksworth), pp. 300–327. Taylor and Francis, London.
- Fox, R. 2004. A tale of two surveys. *Butterfly* **86**: 30–31.
- Glen, D. M. 2004. Birds as predators of Lepidopterous larvae. In *Insect and bird interactions*, (Eds. H.F. van Emden & M. Rothschild), pp. 89–106. Intercept Ltd., Andover.
- Parsons, M. 2003. The changing moth and butterfly fauna of Britain during the twentieth century. *Entomologist's Record and Journal of Variation* **115**: 49–66.
- Spalding, A. & Tunmore, M. 2004. *Planning phase of a national macro-moth recording scheme*. Unpublished report to Butterfly Conservation. Spalding Associates (Environmental) Ltd., Truro.
- Spalding, A., Tunmore, M., Parsons, M. & Fox, R. 2005. The state of moth recording in Britain: the results of the national macro-moth recording scheme consultation questionnaire. *Atropos* **24**: 9–19.
- Thomas, J. A., Telfer, M. G., Roy, D. B., Preston, C., Greenwood, J. J. D., Asher, J., Fox, R., Clarke, R. T. & Lawton, J. H. 2004. Comparative losses of British butterflies, birds, and plants and the global extinction crisis. *Science* **303**: 1879–1881.
- Tunmore, M. 2004. National moth night 2003. *Atropos* **22**: 11–13.
- Tunmore, M., Spalding, A., Parsons, M. & Fox, R. In prep. The county moth recording network in the 21st century: the results of the national macro-moth recording scheme consultation questionnaire for county recorders.
- Vaughan, N. 1997. The diets of British bats (Chiroptera). *Mammal Review* **27**: 77–94.
- Woiwod, I. P. & Harrington, R. 1994. Flying in the face of change: The Rothamsted Insect Survey. In *Long-term experiments in agricultural and ecological sciences*, (Eds. R. Leigh and A. Johnston), pp. 321–342. CAB International, Wallingford.
- Young, M. (1997). *The natural history of moths*. Poyser Natural History, London.

RECENT OBSERVATIONS OF *HIPPOBOSCA EQUINA* L. (DIPTERA: HIPPOBOSCIDAE) IN SOUTH DEVON

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Widespread in the Palaearctic region (Soos & Papp, 1986), *Hippobosca equina* L. is the only member of this genus likely to be encountered in the wild in the UK, although *H. longipennis* Fab. has been recorded on imported animals (cheetahs and other carnivores) on a number of occasions (Hutson in Chandler, 1998), and most recently from Ireland (O'Connor & Sleeman, 1987). Historically *H. equina* has been recorded from many of the southern counties of England, westwards through much of Wales and north to Lincolnshire and Edinburgh, although the latter record is considered dubious (Hutson, 1984). In recent years, *H. equina* has been frequently recorded only from the New Forest with occasional records from the southern counties. Hutson (1984) found *H. equina* to be formerly common in Hampshire, Dorset and much of Wales. Falk & Pont (1996) considered *H. equina* a nationally Notable species whose decline in the last century, despite an increase in horse numbers, could be attributed to changes in the use and husbandry of horses. The modern stronghold of *H. equina* was considered to be the New Forest (VC11) (Hutson, 1984; Falk & Pont, 1996). Now recent records indicate a second breeding population existing in Dartmoor National Park, Devon (VC03).

Typical of the Hippoboscidae, *H. equina* is an obligate ectoparasite feeding on the blood of its hosts, with a flight period in Britain from May to October. As its name implies, the primary host is considered to be the domestic horse, but this species has been known to maintain populations on domestic cattle (Roberts, 1925; Thompson, 1955; Maa, 1969; Askew, 1971; Hutson, 1984). Other hosts in Britain have included man and domestic dogs (Roberts, 1925; Thompson, 1955; Hutson, 1984). Additional hosts in the Palaearctic include the red deer (Kadulski, 1996), camel (Maa, 1969), rabbit (Maa, 1969) and amongst birds the grey heron (Olafsson, 1985) and northern goshawk (Kristofik & Stefan, 1980). In laboratories, *H. equina* has survived and bred on guinea pigs and also been successfully reared artificially through use of a parafilm membrane providing defibrinated bovine blood (Fouda, 1984a, b). *Hippobosca equina* is known to copulate on the host animal and gravid females are noticeable by their distended abdomens. Typical of members of the Hippoboscidae all three larval instars are passed within the uterus (Ferrar 1987; McAlpine *et al.*, 1987) and after an estimated 12 to 14 days developing in the uterus (refers to *H. maculata* L., Schuurmans Stekhoven, 1926) the fully grown larva is rapidly deposited by the female at her chosen pupation site (Roberts, 1925; Thompson, 1955; Hutson, 1984). Unlike the Glossinidae where the female deposits an active third instar larva to crawl or burrow to the pupation site, the Hippoboscidae deposit an already immobile offspring in a suitable location (Askew, 1971; Ferrar, 1987). Roberts (1925) produced the only published observations (5) of British *H. equina* depositing full grown larvae in the wild. The females were observed alighting on fronds of bracken (*Pteridium aquilinum* L.) then dropping to the earth to exude the larva. The deposited larvae were left partially buried in thick humus; all were immobile and pupated within a few hours. Of fourteen other pupae located by handsearching, twelve were found in the organic humus at the base of bracken stems, the remainder in crevices amongst the twisted roots of grass not far from bracken. Roberts (1925) reasoned that the female

H. equina required a thick humus layer, bracken and a degree of sunshine for successful breeding. This factor should be considered when contemplating searching for *H. equina* or when intending to manage suitable habitat. Thompson's review (1955) included records of *H. equina* from 1752 onwards with the first detailed record from the New Forest data ca. 1781. Also quoted was an account of Samouelle obtaining six handfuls of flies from the flanks of a horse, capturing in total over one hundred specimens. An equivalent event has not been subsequently recorded. Thompson (*op. cit.*) included a single record of *H. equina* ostensibly from Devon when some Dartmoor ponies were found to have the flies some seven days later on arrival in Cheshire. The first author first encountered *H. equina* in the late summer of 1996. A specimen was sent for verification and its identification confirmed by J. E. Chainey (pers. comm. 1996, specimen retained Natural History Museum, London). Subsequently several more records for the species have been collated from the Dartmoor area.

Devon entomologist Peter Smithers (pers. com., 1997) communicated his captures of the species in the area and his subsequent donation of specimens to the Plymouth University collection. He had captured two individuals, the first from Mary Tavy (SX5079) in July 1989 and the second from Horrabridge (SX5169) on 20.vi.1993, both localities on the fringes of Dartmoor. The first author initially encountered the species when it landed on his neck in early August 1996; this was during a short walk across Roborough Common, Dartmoor National Park (SX5064). Several more specimens were captured in the next two hours. That same month a specimen was captured when it alighted on the author's forehead on 31.viii.1996 (SX507647) and later numerous individuals were captured flying in the same area on 11.ix.1996 (SX5164 & SX5064). Roborough Common is an area of open heathland grazed by horses, sheep and occasionally cattle with areas of bracken and gorse, *Ulex europaeus* L., with rotational scrub management creating a diverse site. The following year the fly was recorded on 15.v.1997 in Holne Wood, Dartmoor (SX7070). On this occasion the encounter was on a well-worn track along the Dart River valley in the shade of mature beech, *Fagus sylvatica* Fab., and oak *Quercus* spp. The fly alighted on the first author's shoulder and quickly flew off to land on another part of his coat until he captured it on the lapel. Later in that year *H. equina* was recorded in numbers at Roborough Common on 16.ix.1997. Unfortunately no records were obtained from early 1998 to 2000 due to absence from the area but on return in August 2000 a large hippoboscid flew around the first author and alighted on a horse in the vicinity. This occurred during a brief walk on Roborough Common on 2.ix.2000. It was considered to be *H. equina* but unfortunately the example was not captured or observed closely thus preventing reliable confirmation of the record. In 2001 Foot and Mouth problems delayed all fieldwork and consequently no records were returned for *H. equina* in this year. Concerned about the continued presence of the fly in the Dartmoor area following the Foot and Mouth outbreak it was a relief to obtain a positive record for *H. equina* on 24.viii.2002, the specimen alighted on Sarah Turner's dark top during a walk across Roborough Common (SX5064). Close observance clearly revealed it as an example of *H. equina*. The continuance of records over a period of seven years from Roborough Common and the occasional captures elsewhere on Dartmoor strongly suggest that there is a local breeding population on Roborough Common with a potentially larger breeding population distributed across Dartmoor. Records for *H. equina* presented here have, without exception, been collated from incidental captures of flying adults on sunny days and not from careful examination of the host or intentional pursuit of the species therefore adding credence to the belief that the population in the area could be much greater than previously considered.

When attracted to the first author, *H. equina* was observed consistently alighting on any dark clothing worn, even when the option of lighter areas of attire were available. This attraction to coloured clothing may be attributed to colour sensitivity in this species. On one occasion, when a number of *H. equina* were in flight, they were observed alighting on two parked cars, one white and one dark green. Whilst they were more obvious to the observer on the white car's surface they were evidently more attracted to the darker vehicle and spent a significantly greater time on and around this vehicle. Furthermore, in groups of people wearing various coloured clothes and walking in *H. equina* habitat the presence of *H. equina* was restricted to those wearing darker clothing, in particular dark greens, blues and blacks. This has been a predictable, consistent and regular response to colour during the first author's experience of walking through habitat when *H. equina* has been in flight. These observations were compelling although not necessarily borne out by the observations of Roberts (1925). In his brief study on *H. equina*, colour preference was examined using six cows. The cows comprised three colours—black, blue/grey and roan. Averages of 9.8 *H. equina* were observed across the six cattle with the frequency on black being 17, 9 and 4, blue/grey 15 and 4, roan 10, respectively. Clearly, in his small experimental sample Roberts (*op. cit.*) experienced large variation between individuals as exemplified in the results from the black cattle. These observations were contradicted by those of a Mr Bentley in the summer of 1818 when he observed a preference for light coloured horses (Thompson, 1955). There has been extensive research (Green, 1994; Gibson & Torr, 1999; Briscoe & Chittka, 2001) on the visual cues employed by other Diptera. Studies on the sister group Glossinidae showed blue and black screens increased trapping success as did movement (Laveissière & Couret, 1982; Vale, 1974a, b, 1982) suggesting that qualitative field observations of live subjects may produce more robust data. There have been contradictory experiments indicating within species variation with respect to colour preference. *Lucilia sericata* (Meigen) (Calliphoridae) in the UK preferred white, yellow, aluminium, black, red then blue (Wall *et al.*, 1992) but in Hungary preferred black, blue, white then yellow (Hall *et al.*, 1995). These anomalies may be attributable to subtle experimental procedures, movement, geographical race, ultraviolet reflectance or thermal response and may explain the contradictory behaviour of *H. equina* as well as the requirement for carefully designed studies of visual cues. In *H. equina* the subject of colour choice currently remains open and despite the qualitative nature of the observations there appears to be a case for further study into the visual cues involved in host selection.

ACKNOWLEDGEMENTS

The authors thank Peter Smithers of Plymouth University for his assistance in locating old records and access to the University collection and John Chainey of the Natural History Museum, London for his generous assistance in confirming the identification of submitted material. We also thank Dartmoor National Park Authority, in particular Norman Baldock, for permission to conduct research in the region.

REFERENCES

- Askew, R. R. 1971. Diptera Pupipara: Louse Flies and Bat Flies. *Parasitic Insects*. Heinemann Educational Books, London, pp. 51–72.

- Chandler, P. 1998 (ed.). Checklists of insects of the British Isles (New Series). Part I: Diptera (incorporating a list of Irish Diptera). *Handbook for the Identification of British Insects* 12(1):i-xx, 234 pp. Royal Entomological Society, London.
- Briscoe, A. D. & Chittka, L. 2001. The evolution of colour vision in insects. *Annual Review of Entomology* 46: 471-510.
- Falk, S. J. & Pont, A. C. 1996. A review of the scarce and threatened flies of Great Britain. *UK Nature Conservation series*, JNCC, Peterborough.
- Ferrari, P. 1987. Family Hippoboscidae. A Guide to the Breeding Habits and Immature Stages of Diptera Cyclorhapha, Part 1: text. Entomonograph 8.
- Fouda, M. A. 1984a. Maintenance of *Hippobosca equina* (Diptera: Hippoboscidae) fed through parafilm membrane on defibrinated blood. *Zeitschrift für Angewandte Entomologie* 97: 490-493.
- Fouda, M. A. 1984b. Significance of symbionts in *Hippobosca equina* (Diptera: Hippoboscidae). *Zeitschrift für Angewandte Entomologie* 97: 376-378.
- Gibson, G. & Torr, S. J. 1999. Visual and olfactory responses of haematophagous Diptera to host stimuli. *Medical and Veterinary Entomology* 13: 3-23.
- Green, C. H. 1994. Bait methods for tsetse fly control. *Advances in Parasitology* 34: 229-291.
- Hall, M. J. R., Farkas, R., Kelemen, F., Hosier, M. J. & El-Khoga, J. M. 1995. Orientation of agents of wound myiasis to hosts and artificial stimuli in Hungary. *Medical and Veterinary Entomology* 9: 77-84.
- Hutson, A. M. 1984. Keds, Flat-Flies and Bat-Flies. Diptera, Hippoboscidae and Nycteribiidae. *Handbooks for the Identification of British Insects* 10(7). Royal Entomological Society, London.
- Kristofik, J. & Stefan, P. 1980. Novel knowledge about the family of Hippoboscidae (Diptera) in Slovakia. *Biologia* 35: 137-140.
- Kadulski, S. 1996. Ectoparasites of Cervidae in north-east Poland. *Acta Parasitologica* 41: 204-210.
- Laveissière, C. & Couret, D. 1982. Essai de lutte contre les glossines riveraines à l'aide d'écrans imprégnés d'insecticide. Cahiers ORSTOM. *Entomologie médicale et Parasitologie* 19: 271-283.
- Maa, T. C. 1969. A revised checklist and concise host index of Hippoboscidae (Diptera). Studies in Hippoboscidae (Diptera), Part 2. *Pacific Insects Monograph* 20: 261-299.
- McAlpine, J. F. (Ed.), Peterson, B. V., Shewell, G. E., Teskey, H. J., Vockeroth, J. R. & Wood, D. M. 1987. Manual of Nearctic Diptera. Vol. 2, *Research Branch Agriculture Canada Monograph*, 28: 675-1332.
- O'Connor, J. P. & Sleeman, D. P. 1987. A review of the Irish Hippoboscidae (Insecta: Diptera). *Irish Naturalists' Journal* 22: 236-239.
- Olafsson, E. 1985. A heron carrying louse flies to Iceland. *Bliki* 3: 12-14.
- Roberts, J. I. 1925. On the bionomics of *Hippobosca equina*. *Annals of Tropical Medical Parasitology* 19: 81-90.
- Schuurmans Stekhoven, J. H. 1926. Studies on *Hippobosca maculata* Leach and *H. equina* L. in the Dutch East Indian Archipelago. *Parasitology* 18: 35-50.
- Soos, A. & Papp, L. (Eds) 1986. Catalogue of Palaearctic Diptera: *Scathophagidae-Hypodermatidae*, Volume 11. Elsevier, Amsterdam.
- Thompson, G. B. 1955. II: Contribution toward a study of the ectoparasites of British Birds and Mammals, No. 4. *Annual Magazine of Natural History* 12: 25-35.
- Vale, G. A. 1974a. New field methods for studying the response of tsetse flies (Diptera: Glossinidae) to hosts. *Bulletin of Entomological Research* 64: 199-208.
- Vale, G. A. 1974b. The responses of tsetse flies (Diptera: Glossinidae) to mobile and stationary baits. *Bulletin of Entomological Research* 64: 545-588.
- Vale, G. A. 1982. The trap-oriented behaviour of tsetse flies (Diptera: Glossinidae) and other Diptera. *Bulletin of Entomological Research* 72: 71-93.
- Wall, R., Green, C. H., French, N. & Morgan, K. L. 1992. Development of an attractive target for the sheep blowfly *Lucilia sericata*. *Medical and Veterinary Entomology* 6: 67-74.

AN INTERESTING INSECT ASSEMBLAGE REARED FROM
THE BRACKET FUNGUS *INOTUS HISPIDUS* (BULL. EX FR.)
KARST FROM HYDE PARK, MIDDLESEX.

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ABSTRACT

The insect inhabitants of a large bracket fungus *Inotus hispidus* were examined. Sixty-nine insects of eight species and four orders were extracted, including *Orchesia micans* (Panz.) (Coleoptera: Melandryidae), its parasitoid *Meteorus obfuscatus* (Nees) (Hymenoptera: Braconidae), *Helorus nigripes* Förster (Hymenoptera: Heloridae), *Gaurax fascipes* Becker (Diptera: Chloropidae) and *Lasiambia brevibucca* (Duda) (Diptera: Chloropidae). New ecological and distributional data for the chloropids are presented.

A large bracket fungus *Inotus hispidus* (Bull.ex Fr.) Karst (Hymenochaetales) was found in March 2000 in Hyde Park, Middlesex (TQ2780: VC21), lying on the footpath having recently fallen from a London Plane tree *Platanus × hispanica* Miller ex Münchh. (Platanaceae), where it had been growing about 3 metres above ground level. Though generally regarded as being associated with Ash (*Fraxinus excelsior* L., Oleaceae) in the UK, this species is known to attack *Platanus* spp. (Ryvarden & Gilbertson, 1993), and commonly grows on such trees in some German cities (G. Kleist, pers. comm.).

The fungus from Hyde Park was decayed and waterlogged, and contained several pink tenebrionoid larvae. From their size and distinctive pink colour (which is referred to by Donisthorpe, 1939) it was assumed they were larvae of *Orchesia micans* (Panzer) (Melandryidae). Part of the fungus (approximately 18 × 18 × 10cm) was collected and placed in a plastic tray with a glass lid, which was examined daily for emerging insects, which were placed in alcohol. As the fungus was kept indoors, the exact dates of emergence of the insects have little relevance, and were not recorded.

In June the insects that had emerged were examined, and the fungus was broken up under a hand lens to search for further insects and remains of immature stages. The following species were recorded from the fungus:

Order	Family	Species	No.
Lepidoptera	Tineidae	<i>Nemapogon granella</i> (L.)	8
Coleoptera	Melandryidae	<i>Orchesia micans</i> (Panzer)	32
	Ciidae	<i>Cis bilammelatus</i> Wood	1
	Cryptophagidae	<i>Cryptophagus scanicus</i> (L.)	3
Hymenoptera	Braconidae	<i>Meteorus obfuscatus</i> (Nees)	15
	Heloridae	<i>Helorus nigripes</i> Förster	2
Diptera	Chloropidae	<i>Gaurax fascipes</i> Becker	5
		<i>Lasiambia brevibucca</i> (Duda)	3

Orchesia micans is listed as 'Notable B' by Hyman (1992). In the author's experience the adults of this species are the least frequently collected of the three British *Orchesia* species, but are probably under-recorded because of their skulking habits, their association with arboreal fungi (which in summer are still attached to the host tree) and their ability to jump to avoid capture. The larvae are encountered much more easily than the adults. Nikitsky (1996) associates *micans* with *Inonotus obliquus*, *I. radiatus*, *I. hispidus*, *I. dryophilus*, *I. rheades*, *Phellinus* spp. (Hymenochaetales) and *Fomes fomentarius* (Poriales) in the Moscow District, Russia, and suggests a preference for the non-British *I. rheades*. Donisthorpe (1939) lists the following hosts utilised at Windsor Forest, Berkshire: *Fistulina hepatica* (Fistulinales), *Merpilus giganteus* (Poriales) and *Inonotus dryadeus* (Hymenochaetales). It will apparently exploit a wide range of bracket fungi growing on deciduous trees.

The braconid *Meteorus obfuscatus* (Nees), a parasitoid of *Orchesia* spp., was reared in some numbers. *Orchesia micans* and *M. obfuscatus* have been reared together from *I. hispidus* in Norfolk (Evans, 1988b), and the association between them is well established (Huddleston, 1980). This braconid has previously been reported from this grid square (TQ28), in Regent's Park, London (Huddleston, l.c.). It is noteworthy that the ratio of parasitised to non-parasitised *Orchesia* was approximately 1:2. Pupal cells of *Orchesia* were readily found, containing the head capsule of the beetle larva, and often a coarse yellow silk cocoon of *Meteorus*.

The presence of a second hymenopteran, the proctotrupoid *Helorus nigripes* Förster, was initially surprising as this species is usually associated with green lacewings (*Chrysopa* spp.: Chrysopidae) (Townes, 1977), not typically inhabitants of fungi. However, two spherical white silk cocoons were found among the gills of the fungus, resembling baskets with circular hinged lids, and with a few brown hairs attached to the outside. One of these was located only 2 cm from a freshly emerged *Helorus*, and was still damp with mucus from the emergence. As proctotrupoids do not form cocoons, it was suspected that these were the cocoons of lacewings, which was confirmed using Withycombe (1923). Such cocoons are often found under the bark of plane trees in London, and probably the lacewing larvae, which are active predators on foliage, pupate in any available crevice, in this case the gills of the fungus. It was unfortunate that both of the lacewing larvae were parasitised, as an adult chrysopid would have permitted identification to species, thus adding information on the host preferences of *H. nigripes*. Withycombe (1923) reared *H. nigripes* from *Chrysopa septempunctata* Wesmael, and it has been reared from the non-British *C. nigricostata* Brauer on the continent (Fergusson & Smith, 1974).

Helorus nigripes is a very infrequently recorded species; Fergusson & Smith (l.c.) give an account of its British distribution (as *H. rugosus* Thomson), admitting only four British records, three from Middlesex (VC21), Bedford Park (TQ27), 'London N12' (i.e. Finchley, TQ28) and Islington (TQ38), and one from Surrey; Oxshott (TQ16: VC17). Cooter & Fergusson (1993) add a fifth, Tupsley, Hereford (SO54: VC36), but no subsequent published records were found. D. Quicke (pers. comm.) states that Malaise Trapping has shown it to be 'more abundant than the literature suggests'.

The moth *Nemapogon granella* (L.) was found to have developed in the outside layer of the fungus among the gills, indicated by frass and pupal exuviae. This species, which has a very wide global distribution, has previously been recorded from bracket fungi; G. Robinson (NHM) has a toy yak from Nepal made from poriale fungi infested with this moth. The species also occasionally attacks stored products (e.g. Somerfield *et al*, 1980) but, despite its common name 'corn moth', it is not now a major pest of grain. According to M. Honey (pers. comm.) this is only the second

Middlesex record for this species, but this is probably due to under-recording, given its wide distribution and occasional pest status. Evans (1988a) refers to a species of *Apanteles* (Hymenoptera: Braconidae) attacking *Nemapogon* in fungi, but none emerged from this fungus.

Two species of chloropid fly were reared from the fungus. *Gaurax fascipes* Becker has previously been reared from birds' nests (Collin, 1939) and from laburnum bark (BMNH collection, Coll. C. Pugh, vi-1934). Records from the bracket fungus *Piptoporus betulinus* (Bull. Ex Fr.) Karst (Poriales) were considered to represent immature *Gaurax dubius* (Macquart) by Smith (1965). The specimens considered here were also slightly immature but had a dark spot on the hind tibia, a character of *G. fascipes* (J. Ismay, pers. comm.). This would therefore appear to be the first record of *G. fascipes* from fungi. Specimens in the BMNH collection labelled 'Primrose Hill, K.A. Spencer 1957' indicate a previous record from TQ28.

The second chloropid species, *Lasiambia brevibuca* (Duda) is listed as 'Notable B' by Ball (1992), who associates it with 'old woodland and parkland' stating that 'larvae develop in rotting wood and sap runs'. It has been reared from sappy bark of Horse Chestnut *Aesculus hippocastanum* L. (Godfrey, 1998). Ismay (2000) states 'associated with sap flows, damaged trees or rot-holes, but the exact nature of the association is unclear'. Apparently, an association with tree fungi has not previously been noted. Both species of fly certainly emerged from the fungus, as they were still teneral when collected into alcohol in May. Ismay (*l.c.*) lists eleven vice-counties where *brevibuca* has been recorded, mainly in the south of England, extending north to Yorkshire, but not including Middlesex. This is apparently the first record for this sparsely wooded vice-county.

The remaining insects, *Cryptophagus scanicus* (L.) and a single female *Cis bilammelatus* Wood, were found alive as adults inside the dried fungus. It is probable they did not develop in the fungus as only small numbers were present, and there was no evidence of immature stages, but they were almost certainly feeding on the fungus. *Cis bilammelatus* is a naturalised species from Australia, but is now one of the commonest members of the Ciidae in Britain; however, this is apparently the first record from *Inonotus hispidus* (G. Orledge, pers. comm.). It is generally associated with the poriale genera *Piptoporus* and *Coriolus* (Cooter, 1991). *Cryptophagus scanicus* is a common generalist scavenger and fungivore in a wide variety of substrates.

The absence of Staphylinidae (Coleoptera) and larvae of nematoceran Diptera (on which many staphylinids presumably feed) from the fungus is perhaps worthy of mention.

ACKNOWLEDGEMENTS

Because of the number of higher taxa involved, this paper relied heavily on the kind help of a number of expert friends and colleagues. In particular I would like to thank John Ismay (OUMNH) for identifying the Diptera, and for helpful comments. Thanks also to Gaden Robinson (BMNH) who named the *Nemapogon*, Glenda Orledge (University of Bath) for identifying the ciid, Gavin Broad (Imperial College) for confirming my identifications of the Hymenoptera, and Simon Archer and Gunnar Kleist (Imperial College) for the essential task of naming the fungus. I would like to thank all the above, as well as Darren J. Mann, Martin Honey, Donald Quicke, Howard Mendel and Justin Smith for helpful discussions and advice.

REFERENCES

- Ball, S. 1992. *Recorder Version 3.2, a database for site based species occurrence records*, JNCC, Peterborough.
- Collin, J.E. 1939. On various new or little known Diptera, including several species bred from the nests of birds and mammals. *Entomologist's Monthly Magazine* **75**: 134–154.
- Cooter, J. 1991. *A Coleopterist's Handbook*. Grosvenor Press, Portsmouth. 294 pp.
- Cooter, J. & Fergusson, N.D.M. 1993. *Helorus nigripes* Forster (Hym., Heloridae), a fifth British record. *Entomologist's Monthly Magazine* **129**: 29.
- Donisthorpe, H.St.J.K. 1939. *A preliminary list of the Coleoptera of Windsor Forest*, London, Nathaniel Lloyd: 126 pp.
- Evans, R. 1988a. Fruit Flies from Fungi. *Norfolk Natterjack* **28**: 3
- Evans, R. 1988b. A common bracket fungus and its inhabitants. *Norfolk Natterjack* **28**: 4
- Fergusson, N. & Smith, K.G.V. 1974. *Helorus rugosus* Thomson (Hym., Heloridae) in Britain. *Entomologist's Monthly Magazine* **109**: 222.
- Godfrey, A. 1998. The Diptera of Moccas Park National Nature Reserve. *Dipterists Digest* (2nd Series) **5**: 44–48.
- Huddleston, T. 1980. A revision of the western Palaearctic species of the genus *Meteorus* (Hymenoptera: Braconidae). *Bulletin of the British Museum (Natural History) (Entomology)* **41**: 1–58.
- Hyman, P.S. (revised Parsons, M.S.) 1992. *A review of the scarce and threatened Coleoptera of Great Britain*. Part 1. UK Nature Conservation 3. Peterborough: JNCC.
- Ismay, J.W. 2000. The British species of *Lasiambia* Sabrosky (Diptera, Chloropidae). *Dipterists Digest* **7**: 59–70.
- Nikitsky, N.B., Osipov, I.N., Chemeris, M.V., Semenov, V.B. & Gusakov, A.A. 1996. *The beetles of Prioksko-Terrasny Biosphere Reserve—Xylobiontes, Mycetobiontes and Scarabaeidae (with the review of the Moscow Region fauna of these groups)*. Archives of the Zoological Museum of Moscow. **36**: 196 pp.
- Ryvarden, L. & Gilbertson, R.L. 1993. *European Polypores, part 1: Abortiporus—Lindtneria*. Grønlands Grafiske, Oslo, 387 pp.
- Smith, K.G.V. 1965. The immature stages of *Gaurax* (= *Botanobia*) *dubius* (Marquart) (Dipt: Chloropidae), with notes on the specific status of *G. fascipes* Becker. *Entomologist's Monthly Magazine* **100**: 237–239.
- Somerfield, K.G., Manson, D.C.M. & Dale, P.S. 1980. Insects and mites associated with dried milk product storage areas in New Zealand. *New Zealand Journal of Experimental Agriculture* **8**: 83–85.
- Townes, H. 1977. A revision of the Heloridae (Hymenoptera). *Contributions of the American Entomological Institute* **15**: 1–12.
- Withycombe, C.L. 1923 Notes on the biology of some British Neuroptera (Planipennia). *Transactions of the Entomological Society of London*, **55**: 501–94.

***Dolerus megapterus* Cameron (Hymenoptera: Tenthredinidae) in Southern Britain.**

A male sawfly collected in carr woodland adjacent to the Kennet & Avon canal at Burghfield Bridge, Berkshire (SU6770) on 17.vi.03 was identified as *Dolerus megapterus*, which according to Benson (1958) is associated with Cyperaceae. With several records from northern Scotland, and also found in the Manchester area of England. – JONTY DENTON, Kingsmead, Wield Road, Medstead, Hampshire, GU34 5NJ, UK & GRAHAM A. COLLINS, 15 Hurst Way, South Croydon, Surrey, CR2 7AP, UK.

REFERENCE

- Benson, R.B. 1958. Hymenoptera 2. Symphyta. Section (b). *Handbooks for the Identification of British Insects*, **6.2(b)**, 51–137.

***EULECANIUM EXCRESCENS* (FERRIS) (HEMIPTERA: COCCIDAE), AN ASIAN PEST OF WOODY ORNAMENTALS AND FRUIT TREES, NEW TO BRITAIN**

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ABSTRACT

Eulecanium excrescens (Ferris) is reported causing serious damage to ornamental *Wisteria* plants in Greater London, England. This is the first record of this polyphagous Asian pest in Europe. In China, it is a pest of apple, pear and peach trees although in the USA it does not cause economic damage. The host range, biology, geographical distribution and economic importance of *E. excrescens* are reviewed. *Coccophagus obscurus* Westwood (Hymenoptera: Aphelinidae) is recorded parasitising the scale for the first time.

INTRODUCTION

In the autumn of 2001, a member of the public reported that unusually large, soft-scale insects (Hemiptera: Coccidae) were causing leaf loss and dieback to a 15 m tall *Wisteria* sp. plant in a private garden in Vauxhall, London. Samples received at the Central Science Laboratory (CSL), via Andrew Halstead of the Royal Horticultural Society (RHS), could not be identified at the time because only old, heavily-sclerotised, post-reproductive adult females and second-instar nymphs were present. However, repeat samples were regularly sent to the Central Science Laboratory until April 2002, when the presence of young adult females allowed the identity of the pest to be confirmed as *Eulecanium excrescens* (Ferris). This species is known as the 'Excrescent scale' in the USA and is now called the 'Wisteria scale' in the UK. A follow-up visit to the garden by the Plant Health and Seeds Inspectorate (PHSI) found enormous numbers of the pest on *Wisteria* sp. and smaller numbers on cherry (*Prunus* sp.) and South African trumpet vine (*Podranea ricasoliana* (Tanfani) T. Sprague). A limited survey of *Wisteria* spp. in Central London found *E. excrescens* at eight further locations during 2002 and 2003. The presence of this new pest was publicised by the Department for Environment, Food and Rural Affairs (Defra) (Anon., 2002; Malumphy & Matthews, 2002) and widely reported in the media, including the radio, national broadsheets, magazines and on the internet (Anon., 2003a, 2003b, 2003c, 2003d, 2003e; Gianfrancesco, 2002; Whitsey, 2003). The purpose of this communication is to publish collection details for the first time and review the host range, biology, geographical distribution and economic importance of *E. excrescens*.

Slide-mounted specimens of *E. excrescens* have been deposited at the Central Science Laboratory and the Natural History Museum, London (BMNH). Dry specimens have also been stored at the Central Science Laboratory.

DETECTION AND IDENTIFICATION

All developmental stages of *E. excrescens* occur on the bark of the host plant. The first- and second-nymphal instars also occur on the undersides of foliage. Adult females are globular, dark brown and usually covered in a grey powdery wax that resembles mould growth (Figs. 1 & 2), but the waxy bloom is lost in older specimens

(Fig. 3). The adults attain a length of 13 mm and height of 10 mm and are larger than any other species of Coccidae found in Britain. The first instars are orange (Fig. 4), and second and third instars brown with discrete blocks of translucent wax dorsally (Fig. 2).

Teneral adult females are required for identification and were described and illustrated by Gill (1988) and Kosztarab (1996); both provided diagnostic keys. *Eulecanium excrescens* may be distinguished from the six native British species of *Eulecanium* by the high density of multilocular pores present on the ventral surface between the posterior and anterior spiracles, extending over the head as far as the antennal bases. The multilocular pores on the ventral surface of the native *Eulecanium* spp. are sparse between the posterior and anterior spiracles and are rarely present near the antennal bases.

HOST PLANTS AND BIOLOGY

Eulecanium excrescens is highly polyphagous and is recorded feeding on many deciduous orchard and ornamental trees in the USA (Essig, 1958; Gill, 1988; Kosztarab, 1996). Many of the known host plants are widely grown in the UK, for example, apple (*Malus* spp.), almond (*Prunus dulcis* (Mill.) D.A. Webb), apricot (*Prunus armeniaca* L.), cherry (*Prunus* spp.), elm (*Ulmus* spp.), peach (*Prunus persica* (L.) Stokes), pear (*Pyrus communis* L.), sycamore (*Acer pseudoplatanus* L.), walnut (*Juglans regia* L.) and *Wisteria* spp. The last appears to be a preferred host genus in both the USA and the UK.

The following biological observations were made on populations of *E. excrescens* breeding on *Wisteria* sp. in London between November 2001 and May 2003. *Eulecanium excrescens* had one generation a year and appeared to be parthenogenetic, as no male nymphs or adults were observed in the large samples examined. The nymphs overwintered and reached maturity in April. Eggs were laid under the body of the female, which became strongly concave, hard and sclerotised. Each female laid approximately 2000 eggs, which hatched over several days but the first instars emerged en masse (Fig. 3) from the end of May to the end of June. The nymphs fed on the foliage before moving to the woody parts of the plant in the autumn prior to leaf fall.

A low level of parasitism was observed in populations of *E. excrescens* collected in London, and *Coccophagus obscurus* Westwood (Hymenoptera: Aphelinidae) was reared from parasitised scales for the first time. In China, natural enemies of *E. excrescens* include the beetle, *Anthribus niveovariegatus* (Roelofs) (Coleoptera: Anthribidae) and an unidentified entomopathogenic fungus (Deng, 1985).

GEOGRAPHICAL DISTRIBUTION

Eulecanium excrescens originated from Asia and has been accidentally introduced to the USA, where it has been recorded from California, Connecticut, New York, Oregon and Pennsylvania (Kosztarab, 1996). The origin of the UK outbreaks is unknown, although the size of the pest populations, their distribution and the extent of damage to *Wisteria* sp. plants, suggest that *E. excrescens* has been present in London for several years. This is the first record of *E. excrescens* in Europe.

It is possible that *E. excrescens* is more widespread within London than is currently known, since potential host genera such as *Acer*, *Malus*, *Prunus*, *Ulmus* and *Wisteria* are very common and the first-instar scales are readily dispersed on air currents, such as those generated by passing traffic. Furthermore, the presence of

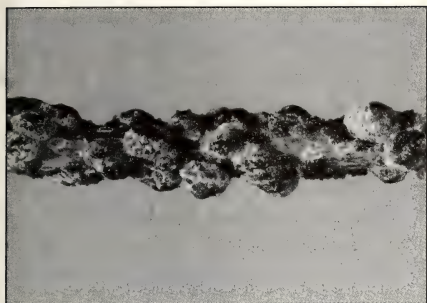


Fig. 1. Young adult female *Eulecanium excrescens* on *Wisteria* sp.

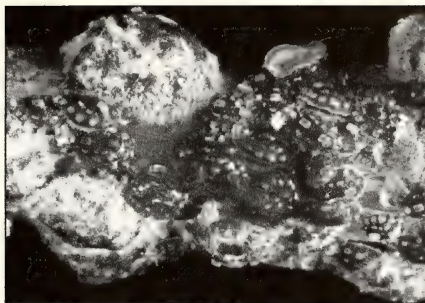


Fig. 2. Adult female *Eulecanium excrescens* covered in a grey powdery wax bloom and nymphs with small rectangular wax plates.



Fig. 3. Post-reproductive adult female *Eulecanium excrescens* on *Wisteria* sp. The scale bar is in mm.



Fig. 4. Swarming horde of first instar *Eulecanium excrescens*.

E. excrescens in the Pacific Northwest of North America, which has a maritime climate somewhat similar to the UK, suggests that it may also be able to establish outside of London.

RECORDS OF *EULECANIUM EXCRESCENS* IN BRITAIN

Eulecanium excrescens has been found at thirteen private premises and one public garden in Greater London:

Belgravia (SW1), on *Wisteria* sp., 24.iv.2003, D. Alford; Chelsea (SW13), at five separate private gardens, on *Wisteria* sp., 8.v.2002 and 13.v.2002, PHSI; Chiswick (W4), private garden, on *Wisteria* sp., 1.v.2003, Mrs. Lang; Earl's Court (SW10), private garden, on *Wisteria* sp., 22.iv.2002, G. Watson; Kew (TW9), botanical garden, on *Wisteria* sp. (together with *Coccus hesperidum* L. and *Parthenolecanium corni* (Bouché)), 2.x.2003, PHSI; Northfields (W13), private garden, on *Wisteria* sp., 17.ii.2003, S. Ericson; South Kensington (SW7), private garden, on *Wisteria* sp., 28.v.2002, N. Coleman; Teddington (TW1), private garden, on *Wisteria* sp., 11.ii.2003, E. Twyman; Vauxhall (SE11), two adjacent private gardens, on *Wisteria* sp., 12.xi.2001, 21.i.2002, 16.ii.2002, 7.iv.2002, H. Renier, and on *Podranea ricasoliana*, *Prunus* sp. and *Wisteria* sp. (an enormous infestation), 17.iv.2002, PHSI.

ECONOMIC IMPORTANCE

Eulecanium excrescens feeds on plant phloem sap, which weakens the host and can cause leaf loss and slow dieback, as has been apparent on heavily infested *Wisteria* sp. in London. In addition, it eliminates excess sugar-rich plant sap as 'honeydew'; this encourages the growth of black sooty mould, detracting from the aesthetic appeal of ornamental plants, reducing their area of photosynthesis and promoting leaf drop.

In China, *E. excrescens* is recorded as a pest of apple, pear and peach trees and the predatory beetle *A. niveovariegatus* has been studied as a possible biological control agent (Deng, 1985). In California, where it is rare, it is not considered an economic pest (Gill, 1988).

CONCLUSIONS

Eulecanium excrescens is a polyphagous pest of economically important orchard trees in China and has been introduced accidentally into the USA and Britain. Large populations have been found at several locations in London and it is likely that the pest has been present outdoors for several years. What effect the organism may have on commercial orchards in the UK is unknown. Eradication of *E. excrescens* from the UK by chemical means would be difficult, as it is present on large woody plants in private premises and there are few, if any, fully effective control products available (MacLeod & Matthews, 2003).

Suspected outbreaks, or interceptions, of *E. excrescens* on growing plants should be reported to the local Defra Plant Health and Seeds Inspectorate office or to the PHSI HQ, York (Tel.: 01904 455174, Fax: 01904 455197) and samples should be submitted to the Central Science Laboratory for identification.

ACKNOWLEDGEMENTS

Andrew Halstead, senior entomologist of the RHS, Wisley, sent the initial sample to CSL. Dr Gillian Watson of the BMNH confirmed the original species identification and reported several populations of the scale to CSL. David Alford also notified CSL of a finding in London. Dr John Noyes of the BMNH identified the *Coccophagus*. This work was funded by the Plant Health Division, Defra.

REFERENCES

- Anon. 2002. *Wisteria* 'excrescens' scale (*Eulecanium excrescens*). Plant Health Newsletter. Department for Environment, Food and Rural Affairs. No. 3 July 2002. 2 pp.
- Anon. 2003a. News. New-to-Britain 2002. *Wisteria* scale (*Eulecanium excrescens*) The Royal Horticultural Society. <http://www.rhs.org.uk/news/newtop10pests.asp>
- Anon. 2003b. News and Reviews. New Garden Pests. Crocus, Gardeners by Nature. <http://www.crocus.co.uk/whatsgoingon/sciencenews>
- Anon. 2003c. Alien Creatures. *Wisteria* Scale Insect (*Eulecanium excrescens*). Down Garden Services. <http://www.dgsgardening.btinternet.co.uk/aliens.htm>
- Anon. 2003d. Foreign pests are feasting on our plants. Bugwatch.info, In the news. <http://www.bugwatch.info/InTheNews.html>
- Anon. 2003e. Rural News. Visiting bugs threaten British plants. NFU Countryside. <http://www.nfucountryside.org.uk/news/shownews.asp?newsid=637>
- Deng, D.L. 1985. *Anthrribus niveovariegatus* (Reolofs)—a natural enemy of *Eulecanium excrescens* Ferris. *Plant Protection* (Zhiwu Baohu) 11, 14–15.
- Essig, E.O. 1958. *Insects and Mites of Western North America*. Macmillan, NY. 1050 pp.

- Gianfrancesco, R. 2002. Foreign Foes. *Gardening Which?* August 2002. 354–7.
- Gill, R.J. 1988. *The scale insects of California. Part 1. The soft scales (Homoptera: Coccoidea: Coccidae)*, California Department of Food and Agriculture, Technical Series in Agriculture Biosystematics and Plant Pathology No. 1.
- Kosztarab, M. 1996. *Scale Insects of the Northeastern North America: Identification, Biology & Distribution*. Virginia Museum of Natural History Special Publication 3. Martinsville, USA. 650 pp.
- MacLeod, A. & Matthews, L. 2003. Pest risk analysis for *Eulecanium excrescens*. Central Science Laboratory, UK. 5 pp.
- Malumphy, C. & Matthews, L. 2002. Wisteria scale *Eulecanium excrescens* (Ferris). *Plant Pest Notice* No. 33. Central Science Laboratory, UK. 3 pp.
- Whitsey, F. 2003. Oh dear: more predators on the horizon. 01/02/2003. www.telegraph.co.uk/gardening.

SHORT COMMUNICATIONS

Recent records of scarcer Ephemeroptera from Southern England.—Although rated as RDB2 in Bratton (1991) *Ephemera lineata* Eaton (Ephemeridae) is locally abundant in the Reading area on the Kennet and Holybrook, and also from the Tilehurst area where it can be abundant at light (Chris Raper, pers. comm.). Light trapping at Burghfield Mill (SU6770) in July 2003 attracted large numbers of *E. lineata*, and *E. vulgata* L. *Ephemera danica* Müller was the rarest of the three in the district, and only found close to the Holybrook, (SU6871), the silty sections of which, also yielded several distinctive larvae of *Brachycercus harrisella* Curtis (Caenidae) in May 2003.

On 28th June 2004, I caught a single adult male *E. lineata* in Bushy Park (TQ 1469) approximately 200 m from the Thames. This appears to be the first modern record from the London area, and the first in Middlesex since 1902. Previous records from VC21 were from Teddington in 1901, and Laleham in 1902. Subsequently, adults proved to be widespread and abundant on foliage, especially on lower branches of trees across the park, throughout July into early August. Given the distribution of adults, it would appear likely that it is breeding in the Longford River which crosses the park.

On 20th May 2004, I saw three male mayflies performing a 'yo-yoing' display flight adjacent to a recently created shallow pond, remote from any significant flowing water on Carswell Golf Course, Oxfordshire (SU3396). I caught one which proved to be *E. vulgata*, a puzzling record given the suggested association with muddy-bottomed rivers.

Siphonurus armatus Eaton (Siphonuridae) is described as being associated with lakes, ponds and slow flowing streams and rivers (Elliot & Humpesch, 1983). In Botany Bay-Fisher Lane Woods, Surrey (SU9834) this species occurs in small ephemeral streams, which are often reduced in summer to a series of stony bottomed pools, in which larvae were often abundant. It was first recorded in the late 1970s (Don Tagg pers. comm.), and was still present in the early 1990s at least. – JONTY DENTON, Kingsmead, Wield Road, Medstead, Hampshire, GU34 5NJ. JontyDenton@aol.com.

REFERENCE

- Bratton, J.H. 1991. *A review of the scarce and threatened Ephemeroptera and Plecoptera of Great Britain*. Peterborough, JNCC.
- Elliot, J.M. & Humpesch, U.H. 1983. *A key to the adults of British Ephemeroptera, with notes on their ecology*. Freshwater Biological Association Key No. 47.

Adults of the Horse Chestnut *Pachynemina hippocastanaria* (Hb.) (Lepidoptera: Geometridae) occur throughout the year on the Purbeck heaths, Dorset – On reading through the details of the emergence times of *Pachynemina hippocastanaria* (Hb.) (Horse Chestnut) in the excellent recently published field guide of Waring and Townsend (2003), I was surprised to find that they still give the main emergence periods as April/May and August, with just a passing mention to 'odd records from January and November'. This was certainly not my experience when I operated a Rothamsted Light Trap (200 W Tungsten bulb) nightly for six years during 1971–1976. The trap was located in open mature lowland heath on the RSPB's Arne Nature Reserve, which is situated on a peninsula on the western side of Poole Harbour, Dorset.

I recently located copies of my Rothamsted trap data and find that other than for the occasional bulb failure, the light trap was run continuously between 1.i.1971 and 31.xii.1976. The trap was placed in a shallow valley of open mature dry heath on the southern edge of Arne Heath (map reference SY 98 970877). The vegetation was dominated by mature *Calluna vulgaris* (L.) (Ling), with some *Erica cinerea* L. (Bell Heather). There was also a little *Pteridium aquilinum* (L.) (Bracken), a scattering of *Betula pendula* Roth (Silver Birch), some at least 20 years old and to the south and southwest of the trap 50 m away were a few mature *Pinus sylvestris* L. (Scots Pine) and *P. pinaster* Aiton (Maritime Pine) but mostly <15 year old invading Scots Pine and bushes of *Rhododendron ponticum* L. (Rhododendron). The trap was deliberately located to catch primarily lowland heath species.

The catches of *P. hippocastanaria* are given in Table 1, together with the number of months that it was recorded during the six years. In the period October–January a total of 19 insects was caught, with the exception of two on 8.x.1971, all were single individuals. There were no February records during 1971–1973 but in the next three years it was recorded in small numbers (1–12) scattered through the month, with an exceptional catch of 56 on 26.ii.1976. During March, there was an increase of records spread through the month, usually of 1–8 individuals but 16 on 3.iii.1976.

Table 1. The occurrence of *Pachynemina hippocastanaria* (Horse Chestnut) during 1971–1976 from a Rothamsted light trap located on lowland heath at Arne Nature Reserve, Dorset.

Month	No. of years occurred	Total no. of nights recorded	Total number recorded	Range of catch size	6 year monthly mean
January	5	7	7	1	1.2
February	3	18	105	1–56	17.5
March	6	23	97	1–16	16.2
April	6	42	156	1–18	26.0
May	5	20	26	1–6	4.3
June	6	29	62	1–23	10.3
July	6	124	1096	1–70	182.7
August	6	114	582	1–39	97.0
September	5	25	72	1–12	12.0
October	3	4	5	1–2	0.8
November	3	4	4	1	0.7
December	2	3	3	1	0.5

I raise the matter of 'early and late' emergence with reference to the on-going discussions concerning climate change and global warming. These so-called 'early and late' emergences would appear to be of normal occurrence 40 years ago on the Purbeck heaths. Might the apparent dearth of records be as a result of lepidopterists not running light traps on open lowland heath between January–March and November–December? Because of this, the small but regular emergence in these months on these southern heaths has gone unnoticed. The value of the Rothamsted trap, if placed in a particular habitat, is that the catch can be generally associated with the general environs of the trap site. This trap was sited on open heath that would have been contiguous with over 250 ha of lowland heath. From the data presented it would suggest that at least on the Purbeck heaths, *P. hippocastanaria* occurs throughout the year but in small numbers during the winter months. It is interesting to note from the Rothamsted Insect Survey trap at Yarnar Wood, Devon, which borders heathland, that this species was recorded regularly during 1992 from mid-March onward (Riley, 1993).

If these records were associated with the current time, we would probably be suggesting that this could be an effect of milder winters, which we are now experiencing in south Dorset. However, the records presented refer to the early 1970s, when winters were colder, with regular hard frosts and some snow were the norm.

The data would also suggest that the main time for emergence in this part of the country for the first brood is February to April, and for the second brood from July to August.

REFERENCES

- Riley, A. (1993). Important Lepidoptera records from the Rothamsted Insect Survey national light-trap network. *Entomologist's Gazette* **44**: 173–177.
 Waring, P. & Townsend, M. (2003). *Field Guide to the Moths of Great Britain and Ireland*. British Wildlife Publishing. Hampshire.

BRYAN P. PICKESS,

8 Shaw Drive, Sandford, Wareham, Dorset BH20 7BT

An ant's home is its castle: further notes on the synanthropy of *Lasius brunneus* (Latr.) (Hymenoptera: Formicidae)—Over Christmas 2003 I visited Berkeley Castle, Gloucestershire, where Castle Director Elizabeth Halls mentioned that they had ants in the roof timbers within the Great Hall. They had been brought down with debris throughout the summer for at least the previous two years when the cleaners had swept one of the stone corbels. Being rather intrigued by the idea of ants nesting in wooden timbers 16 feet up inside a 13th century room, I requested that some of these ants be collected when they were next found.

In mid-May 2004, I discovered a jar of sawdust from the Castle on my desk. The sawdust contained a number of dead ants and they were identified as *Lasius brunneus* (Latrielle). This species is very abundant at Whitcliff Deer Park nearby, where it inhabits its more usual habitat of tree trunks. Here I have confirmed it from *Quercus robur* L., *Aesculus hippocastanum* L. and *Crataegus monogyna* Jacq., and have also seen it on *Malus domestica* Borkh. elsewhere.

Jones (2003) notes that this species has been found raiding a tin of biscuits, though they may have originated from outside. Attewell (2004) reports four

occasions of the species either entering buildings to raid food cupboards, or dwelling within the wooden timbers of buildings and utilising an unknown food source. However, there was no available food source near the Great Hall and it seemed unlikely that the roof itself would be able to provide sufficient food, so further investigation was made.

Having realised that the only food source nearby would be either dead animal matter within the wooden beams or food outside, the roof was checked. Sure enough, *L. brunneus* was found on the masonry, though these appeared to be nesting within the masonry itself and could be watched entering holes beside one of the stones. Czechowski *et al.* (2002) note that the species is occasionally found in brick or stone buildings, though this may be the first time that this habit has been recorded in the UK. The only other ant species that was noticed sharing the castle roof with the *L. brunneus* were a small number of *L. niger* (L.) s.s.

Further observation of this colony clearly showed two trails of *L. brunneus* workers, one of which was followed about a metre to the carcass of a pill woodlouse (*Armadillidium* sp.). The workers were clearly scavenging from this carcass, carrying small pieces back to the nest.

The other trail led along some electrical cables, which went over the wall and about three metres down the side of the castle. These cables then fed into a hole in the wall, where honeybees *Apis mellifera* L. had made their nest. It is likely, therefore, that the ants were entering the bee colony and stealing honey. The bees themselves did not seem concerned and the steady stream of ants moving up and down the cables indicated that this may have been a major source of food. Certainly, it would more than make up for the lack of aphids and therefore honeydew on the castle roof, which is their normal food source (Czechowski *et al.*, 2002).

Another observation was the much smaller size of the masonry nesting *L. brunneus* when compared with those from inside the castle. The reasons for this seem unclear, as it would appear that their food supply would not be limiting their maximum size. One speculation is that the available crevices in the masonry were narrower than the beetle bore holes in wood that they normally nest in, and that this was in turn affecting the size of the ants themselves. This would lead to the conclusion that they do not excavate nest sites themselves, but instead rely entirely upon already available tunnels and crevices.

—MIKE LUSH, Just Ecology, The Old Wheelwrights, Ham, Berkeley, Gloucestershire GL13 9QH.

REFERENCES

- Attewell, P. J. 2004. *Lasius brunneus* (Latr.) (Hymenoptera: Formicidae): house ant, hero and coward. *British Journal of Entomology and Natural History* 17: 24.
- Czechowski, W., Radchenko, A. & Czechowska, W. 2002. *The ants (Hymenoptera, Formicidae) of Poland*. Museum and Institute of Zoology PAS, Warsaw.
- Jones, R.A. 2003. *Lasius brunneus* (Latr.) (Hymenoptera: Formicidae) found indoors. *British Journal of Entomology and Natural History* 16: 219.

Female Oriental Fruit Moth *Grapholita molesta* (Busck) (Lepidoptera: Tortricidae) reared from larva found in nectarine—On 12 September 2003 I purchased a 1 kg punnet of nectarines from the Lidl supermarket in Shirley, Southampton, Hampshire (VC 11), when I noticed a bore-hole in one of the fruits. The punnet-label specified the nectarines, *Prunus persica* (L.) Batsch var. *nectarina* (Aiton), as being Italian

variety Stark Red Gold. On carefully prising the flesh apart I found an orange-pink larva, which I placed in a $7.5 \times 5 \times 2.5$ cm transparent Perspex box with fresh nectarine pieces. The food was replaced daily, but after the first day the larva showed a tendency to wander away from the food without feeding. By 14 September it had started spinning up in an upper corner of the box and on 17 September it pupated. The moth emerged on 28 September 2003, and was provisionally classified as *Grapholita* [= *Cydia*] *molesta* on the basis of a description (Bradley *et al.*, 1979) and summary Internet images of the larva and exhibited as such at the BENHS Annual Exhibition on 8 November 2003. Damage incurred during setting had prevented the adult from being reliably distinguished from *G. funebrana* (Treitschke) on the basis of wing morphology, and the specimen was therefore handed to Kevin Tuck, at the Natural History Museum, London, for confirmation. Dissection of the genitalia confirmed that it was indeed *G. molesta*, a female, based on comparison with the illustration in Razowski (2001). I am also grateful to the museum for providing photomicrographs of the slide preparation. These were produced using the Synoptics™ Imaging System, a Microsoft Windows-based system that analyses the field of view 10 pixels at a time at progressive focusing distances through the preparation, recording at each distance those components of the image which are in focus, and then combines these sets of components to give a sharp entire image. Separate photomicrographs of the bursa, sterigma and ostium were provided, and were then joined using the Adobe Photoshop image-editing program to produce the photograph shown in Fig. 1.

This specimen is the third *G. molesta* known to have been reared in Hampshire from imported fruit (see Goater & Norriss, 2001). However, the number reported by



Fig. 1. Genitalia of the female *Grapholita molesta*. Diagnostic features are the corpus bursa (at bottom) bearing two spine-like signa, and the sterigma (indicated by arrow) surrounding the ostium. For comparison see also Bradley *et al.* (1979). For explanation of genital anatomy see Scoble (1995). Dissection and photomicrography by Kevin R. Tuck.

consumers will almost certainly be lower than the total they encounter, on account of their tendency to discard infested fruit without further consideration. At the same time, the poor provision on the part of the UK agricultural pest monitoring agencies of specimens suitable for preservation has resulted in a paucity of genuine British adventives in museum collections. An enquiry to the distributors, Milani & Fragor Group S.p.A. of Verona, Italy identified the fruit batch and accordingly the insect as having originated from northern Italy, though they were unable to trace the specific locality. Following Mr Tuck's request, I was delighted to donate the specimen, together with the pupal exuviae and punnet-label, to the Natural History Museum collection where these are all now safely housed.—L. WINOKUR, Flat 3, Charles Court, 7 Darwin Road, Southampton, Hampshire SO15 5BS.

REFERENCES

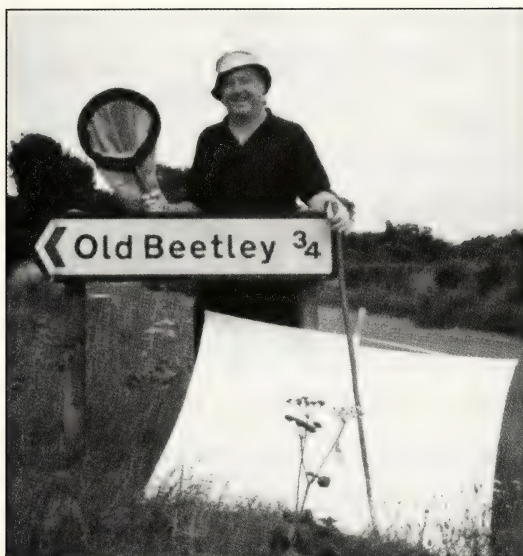
- Bradley, J. D., Tremewan, W. G. & Smith, A. 1979. *British Tortricoid Moths. Tortricidae: Olethreutinae*. Ray Society, London. (Reproduced and released on CD in 2004 by Pisces Publications, Lymington, Hampshire).
- Goater, B. & Norriss, T. 2001. *Moths of Hampshire and the Isle of Wight*. Pisces Publications, Newbury and Hampshire County Council.
- Razowski, J. 2001. *Die Tortriciden Mitteleuropas*. F. Slamka, Bratislava.
- Scoble, M. J. 1995. *The Lepidoptera: Form, Function and Diversity*. The Natural History Museum and Oxford University Press.

Ten additions to the Heteroptera (Hemiptera) of Cornwall.—During the course of a detailed review of the Cornish bug fauna it has become apparent that a number of new county records have been made over the past fifteen years: *Kleidocerys resedae* (Panzer), Vicarage Cliff, Morwenstow (SS11), one at flowers of *Cochlearia danica* close to a wet valley with alders, 18.iv.2003; *Cymus melanocephalus* Fieber, Dizzard Wood (SX19), one swept, 13.vii.1989; *Physatocheila smreczynskii* China, Boconnoc Park (SX15), beaten from old orchard apple trees, 20.v.1990; *Nabis lineatus* Dahlbom, Cam Draught, Crackington (SX19), one in cattle-grazed wet valley with *Molinia* tussocks, 11.vii.1989; *Himacerus apterus* (Fab.), Boconnoc Park (SX15), off an open-grown hawthorn, 20.v.1990, and Ethy Park (SX15), 30.v.2000; *Psallus wagneri* Ossiannilsson, Dizzard Wood (SX19), male dissected, 10.vii.2001; *Orthocephalus coriaceus* (Fab.), Pednvanan, Porthcurnick (SW83), 20.viii.2002; *Heterocordylus genistae* (Scopoli), Lower Predannack Cliff (SW61), swept from *Genista tinctoria*, 14.vi.1989; Lizard Point (SW61), *G. tinctoria*, 15.vi.1989; Pedngwinian, Gunwalloe, Penrose Estate (SW62), plentiful on *G. tinctoria*, 5.vi.1989; *Orthotylus viridinervis* (Kirschbaum), Nare Head (SW93), beaten from elm, 4.vii.1989, and Cotehele (SX46), 21.vi.1989; *Mecomma dispar* (Boheman), Millook Valley (SX19), single male swept, 10.vii.2001.

The results of the full county review will be published in due course. Anyone with bug records which they have not previously forwarded to the county records centre is invited to send the details to me as soon as possible if they would like them included.

Thanks to the Environmental Records Centre for Cornwall and the Isles of Scilly for access to their county record compilation and to the Cornwall and Isles of Scilly Federation of Biological Recorders for encouragement to publish. — KEITH N. A. ALEXANDER, 59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ.

OBITUARY

DAVID ALFRED PORTER
1940–2003

David Alfred Porter was born in Bridport, Dorset on 24 October 1940. Son of a stone mason and a children's nurse he died on 21 July 2003 aged 62, after a long and bravely fought illness. He was educated at Grove School, St Ronan's School and Bridport Grammar School and after taking his 'A' levels in Biology and Chemistry, moved to Saffron Walden, Essex, for his first teaching appointment in October 1959 where he taught general subjects including English, History, Agricultural Science and Games at the local Technical and Secondary Modern School. In October 1960 David enrolled for a three year course at Westminster Teacher Training College. Afterwards he taught Biology at Barnwell Secondary Modern School at Stevenage, Herts and in 1964 initiated the school's Natural History Society and soon found room in his laboratory for moth emergence cages and store boxes for insect collections. The society proved so popular that at one time over 100 of the school's 700 pupils were members! David subsequently moved into an old rectory that adjoined the school and with its sizeable basement the society's storage space was expanded to include tropical freshwater fish, animal hutches and even a tank of marine crustaceans. Between September 1966 and June 1970, David undertook a University of London external degree in Botany and Zoology with Geology as a subsidiary and continued to teach at Stevenage whilst attending classes at Luton College.

Following his marriage to Celia Susan Furness on 29 July 1972 at St Mary's Church, Shephall, Stevenage, David moved to Hailsham, East Sussex where he was appointed Head of Biology at the town's Comprehensive School. He took early retirement in 1993 and this at last allowed him to devote more time to entomology.

David joined the society in 1987 and his entomological interests are recorded as Coleoptera, Heteroptera and Diptera. In fact David took an active interest in all insect Orders, but beetles were always his favourite group. He travelled to many

parts of Britain in pursuit of his hobby but was especially fond of the coastal cliffs near his birthplace in Dorset and it was his ambition to publish an update to the list of Coleoptera recorded from that county. David also made several noteworthy entomological discoveries in Dorset and Sussex. He was co-author of a paper introducing the lygaeid bug *Nysius senecionis* (Schilling) to Britain (Hodge & Porter, 1997). Other important finds included the fourth British specimen of *Platycis cosnardi* (Chevrolat) (Col., Lycidae) in June 1984 near Duncton, West Sussex (Porter, 1987), *Anommatus diekei* Reitter (Col., Bothrididae) in 1995 in a subterranean pitfall trap set in his Hailsham garden (Porter, 1998), *Gronops inaequalis* Boheman (Col., Curculionidae) from the Crumbles near Eastbourne in 1996 (Porter, 1998), the subterranean weevil *Raymondionymys marqueti* Aubé (Raymondionymiidae) in a subterranean pitfall trap set in his father's garden at Bridport, Dorset in 1997 (Porter, 1998), and he was the first to find a British male of *Bruchidius varius* (Olivier) (Col., Bruchidae) in September 1996 on a road verge near Plumpton, East Sussex, thus solving the mystery of its specific identity (Hodge, 1997).

The photograph above captures David's sense of humour perfectly and it is fitting that this one was chosen for publication. Even when incapacitated by illness, David retained his enthusiasm for entomology. For example, on a bright sunny day in early May 2003, after what was to be his penultimate appointment at Eastbourne District General Hospital, Celia drove him onto the Downs, and although not strong enough to walk unaided and sweep at the same time, he was still on the look out for opportunities to do a little collecting. So, as they drove home along the coast road towards Birling Gap, David held his sweep net out of the sun roof, the material billowing as the car moved along! He was still interested and wondered what was 'out and about' to the very end.

David's collections of immaculately mounted British insects, mainly Coleoptera but also some Diptera, Hemiptera and Hymenoptera, have been donated to the Booth Museum of Natural History, Brighton. Our sincere condolences are extended to David's widow Celia, his son Richard, daughter Vanessa and his father Albert.

Much of the above information was extracted from "A tribute to David Alfred Porter, 24th October 1940–21st July 2003" prepared and read at David's funeral service on 29 July 2003 at the Church of St Peter and St Paul, Hellingly, East Sussex by his son Richard. A copy of the full text will be stored in the BENHS archives at Dinton Pastures.

PETER HODGE

REFERENCES

- Hodge, P.J. 1997. *Bruchidius varius* (Olivier) (Chrysomelidae) new to the British Isles. *Coleopterist* 5: 65–68.
- Hodge, P.J. & Porter, D.A. 1997. *Nysius senecionis* (Schilling) (Hemiptera: Lygaeidae) new to the British Isles. *British Journal of Entomology and Natural History* 10: 1–2.
- Porter, D. A. 1987. *Platycis cosnardi* (Chevrolat) (Col., Lycidae) in West Sussex. *Entomologist's Monthly Magazine* 123: 106.
- Porter, D.A. 1998. *Gronops inaequalis* Boheman (Curculionidae) in East Sussex. In Hodge, P.J. (Ed.): Coleoptera report for 1997 Annual Exhibition. *British Journal of Entomology and Natural History* 11: 109–110.
- Porter, D.A. 1998. *Raymondionymys marqueti* Aubé (Raymondionymiidae) in Dorset. In Hodge, P.J. (Ed.): Coleoptera report for 1997 Annual Exhibition. *British Journal of Entomology and Natural History* 11: 109–110.
- Porter, D.A. 1998. *Anommatus diekei* Reitter (Bothrididae) in East Sussex. In Hodge, P.J. (Ed.): Coleoptera report for 1996 Annual Exhibition. *British Journal of Entomology and Natural History* (1997) 10: 176.

REVIEWS

Dead Wood: A key to Biodiversity. Proceedings of the International Symposium, Mantova (Italy), 29–31 May 2003. Edited by F. Mason, G. Nardi and M. Tisato. Sherwood 95, Suppl. 2, 100 pp. A4 card-bound report. ISBN 88-901223-0-7. Available from Corpo Forestale dello Stato, Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale, Via C. Ederle 16 a, 37100 Verona, Italy. Also available on the website www.cnbforverona.org.

Another publication from the dynamic National Centre for the Study and Conservation of Forest Biodiversity at Mantova in Italy. The title is more of a strap-line since the publication is really a series of conference papers based around the general theme of the role of dead wood conservation in maintenance and enhancement of forest biodiversity. The delegates also had a round-table session which resulted in the formulation of a three point “Recommendation” on the dead wood issue, for transmission to institutional and European Union bodies. This is perhaps the most important outcome of the Symposium and is repeated here as the BENHS’s own contribution to spreading the word.

The Mantova Symposium ‘Saproxylic’s’ Recommendation

“The participants in the symposium ‘Dead wood: a key to biodiversity’, held in Mantova, May 2003, recommend, on the basis of the information provided by the presentations during the course of the meeting that:

1. A workshop at international level be arranged between specialists in the study of saproxylic flora (including fungi, lichens and mosses) and fauna (vertebrate and invertebrate) and those responsible for managing and monitoring forests selected for inclusion in the Natura 2000 series of sites, with a view to reviewing maintenance of these organisms and how they might be used in monitoring forest conditions, in different types of forest and different parts of Europe, taking (at least) one forest in each EU member State as a case study and with the particular objective of identifying any procedures that might be open to standardisation.
2. The saproxylic species mentioned as characteristic/typical of forest types within the Interpretation Manual of the Habitats Directive be augmented, to cover a greater diversity of the threatened habitats listed in the Directive.
3. Urgent consideration be given to how a computerised database can be provided, of the biological information available for the saproxylics listed as characteristic/typical in the Interpretation Manual, for use as an interpretative tool in all member States.”

I think that we would all support this recommendation, although with the reservation that existing EU devices remain inadequate for promoting long-term conservation of saproxylic communities. The underlying basis for the Natura 2000 series of sites remains the CORINE vegetation classification system which does not adequately recognise the importance of such vital structural components as living ancient trees and the wood-pasture management systems which favour the greatest structural diversity. This has made it difficult – if not impossible – to get many of our own important saproxylic sites added to the Natura 2000 series. And conservation of sites alone will undoubtedly prove inadequate in the absence of sympathetic land management throughout the landscape. Invertebrate populations are dynamic, and site-based measures will not promote successful conservation in isolation.

Also the Symposium's definition of a saproxylic organism as "a species dependent, at some stage in its life cycle, upon the dead wood of senescent trees or fallen timber, or upon other saproxylics" is woefully inadequate. Decaying wood is produced by all trees, not just senescent ones. Live healthy trees produce more decaying wood in the long term than dead or dying trees. This is an important message and it is disappointing to see tree ecology so poorly understood by this gathering of experts. This definition somehow promotes morbidity rather than vitality in forest conservation.

Returning to the various papers. These are either in English or Italian (with or without an English summary) and cover such diverse subjects as: bird and beetle communities in a 30 year old non-intervention forest in Germany, floodplain saproxylic invertebrates in the Czech Republic, a review of hermit beetle *Osmoderma eremita* (Scopoli) conservation in southern Europe, knowledge of the scarab *Eupotosia mirifica* (Mulsant) across Europe, work on the weevil *Gasterocercus depressirostris* (F.) in northern Italy, a description of the development and use of rearing boxes filled with wood shavings, management proposals for increasing the amounts of dead wood in forests, educational experiences with promoting dead wood, dead wood in French and Swedish managed forests, and a description of the LIFE project in Bosco Della Fontana, Italy.

Key papers, in my view, are a paper on the dynamics of wood-decaying fungi by Pertti Renvall of Finland, and a discussion of the "development of eco-friendly forestry practices in Europe and the maintenance of saproxylic biodiversity" by Martin Speight and Jervis Good from Ireland. The former is a valuable contribution to helping entomologists to understand the dynamics of decaying wood, while the latter covers the vitally important point that maintenance of quantities of coarse woody debris—so beloved of foresters—is largely irrelevant to the maintenance of biodiversity in saproxylic hoverflies. The authors quite rightly point out that this overlooks the importance of decay micro-habitats in live trees and it is good to see this being so forcefully stated outside of a purely entomological gathering.

Overall, this is a key publication for those of us involved in the conservation of saproxylic organisms, and will be especially valuable for site managers as well as people working at the strategic level in conservation.

KEITH N. A. ALEXANDER

Bumblebees by Murdo Macdonald. (Battleby: Scottish Natural Heritage, 2003) 36 pp. Paperback £4.95. ISBN 1 85397 364 5.

This book is an excellent short introduction to bumblebees, with enjoyable text and superb photographs. It is highly recommended.

The book is organised under eight main sections. The first asks what is special about bumblebees and explains the names given to them. The second, on foraging, emphasises their importance as pollinators. The third outlines their life cycle and how cuckoo bumblebees parasitise colonies of the other social species. Next are comments on flight and why bumblebees sting. There is a longer, nicely illustrated, fifth section on their habitats, followed by sections on threats and conservation. A final section addresses finding further information.

A short book like this can only give a taste, but can entice readers to find out more about a group. Although bumblebees are already popular, these photographs will certainly help to capture attention. There are beautiful illustrations of several attractive bumblebees that are particularly associated with Scotland, including the

dark island form of *Bombus muscorum* (L.), the rare *B. distinguendus* Morawitz and the colourful *B. monticola* Smith.

The information on bumblebee habitats and conservation should help to encourage people to look more closely at their local bees and at what those bees are doing. If one has to find an area where such a book might be strengthened, it might be in providing more detailed guidance towards further information on bumblebee biology and identification, particularly on the web, and towards involvement in the different recording activities. The author has done a good and original job in a limited space, so that the book should have very broad appeal.

PAUL WILLIAMS

Dragonflies of Bedfordshire by Steve Cham. Bedfordshire Natural History Society, 2004, 139 pp, 157 colour photographs. Hardback £24.50 + £2.50 postage and packing. ISBN 0 9506521 7 2. Available from Mrs S. E. Brooke, 18 Park Hill, Teddington, Beds LU5 6AW.

This latest addition to the growing number of county dragonfly books is much more than just a distribution atlas. It has information about dragonflies which will be of interest to all entomologists. Almost every page has one or more excellent colour photographs and each species found in Bedfordshire has a county distribution map and also a map showing the distribution for Britain in general. The species accounts are laid out in a more informal manner than those of most other county books and include interesting field notes of the author's personal observations and also some from other observers in Bedfordshire. The usual notes on habitat, status, flight period and records past and present are of course also included. More general information specific to Bedfordshire includes articles on watching dragonflies, collecting records, and habitats for dragonflies. However, much of this is useful information that can be applicable to other counties also. There are several appendices, one of which is devoted to the British Dragonfly Society's Code of Practice. One particularly interesting article is concerned with the different methods of distribution mapping currently in use, illustrating the various degrees of accuracy achievable depending on the method adopted by the recorder.

The author, Steve Cham, is a well known and respected active member of the British Dragonfly Society. His book is a testimony to his hard work and great knowledge of, and enthusiasm for, these beautiful and fascinating insects, and to his skill and patience with photographic equipment. I have to agree with the writer of the Foreword, Ruary Mackenzie Dodds, who states "Steve's book sets a standard for others to follow". It is also a useful and worthwhile addition to any dragonfly enthusiast's library, whether they be a resident of Bedfordshire or from another part of the country.

JOHN BROOK

The Dragonflies of Europe (revised edition) by R. R. Askew. (Colchester: Harley Books, 2004). 308pp. Hard cover £30.00. ISBN 0 946589 75 5.

The increased attention focussed on dragonflies and damselflies over the past 15 years has resulted in a greater understanding of the biology and distribution of Odonata around the world. While there have been many popular titles on dragonflies

and damselflies to compliment this increase in interest, 'The Dragonflies of Europe' by Richard Askew remains as one of the most useful texts on the Odonata fauna of Europe. First published in 1987, the text in this revised edition remains broadly similar to that of the original, however minor corrections have been made to the text and details of ten new European species of Odonata have been included.

The introduction to this title is clear and concise and provides a sound basic understanding of the biology and ecology of the subject matter. The main body of the book is devoted to detailed descriptions of the European fauna. Taxonomic keys to both adults and larvae are provided, together with detailed descriptions of the adult, their biology, European distribution and flight period.

Particular points in the descriptions are emphasised by the use of clear line drawings. In addition, figures of the whole insects are included on 30 colour plates, however these are collected together at the end of the book rather than alongside the relevant description.

This book has another somewhat irritating feature. Although this is a revised edition, revisions to the text are grouped together in a supplement at the end of the volume, rather than being inserted into the text at the relevant point. This results in the reader having to flick backwards and forwards between the main text and the supplement to ensure that the page you are reading is correct. Fortunately, the list of revisions is not extensive, and mainly relates to changes in nomenclature.

The 10-page supplement also provides brief descriptions of species that have been recognised from Europe since the publication of the original text. The remainder of the supplement is devoted to describing changes in the recorded ranges of species within Europe, and a list of new distribution records for individual countries.

The list of references included at the end of this book is impressive, containing 650 pieces of literature pertaining to the Odonata fauna of Europe and beyond. This revised edition also includes references to the European fauna that have been published since the publication of the original text.

In summary, 'The Dragonflies of Europe' remains one of the best all round texts available. It combines a detailed introduction to the subject with the necessary descriptions and keys to allow the identification of dragonflies and damselflies from across Europe.

CRAIG MACADAM

Arthropods of economic importance: Diaspididae of the world. CD-ROM by G.W. Watson, (2002). Expert Center for Taxonomic Identification (ETI), University of Amsterdam, The Netherlands. Mac and Windows versions on one CD-ROM. ISBN 90-75000-48-0. Suggested retail price £77.95 excluding VAT and p.p. Order from: ETI Information Services Ltd, 83 Clifton Road, Wokingham, Berkshire RG41 1NJ; tel: +44 (0)118 962 7072.

Armoured scale insects are important agricultural, horticultural and forestry pests that are difficult to identify. This CD-ROM holds an interactive identification guide and information source on economically important diaspidids of the world. It aims to enable agricultural entomologists working in agriculture, horticulture and forestry and plant quarantine inspectors to identify the most important species for themselves. The CD-ROM contains a pictorial key to adult females of 100 species in 48 genera, detailed information on their taxonomy, and information on their host-plants, biology and ecology, economic impact, natural enemies, distribution and

common names. Diagnostic characters, distribution and host-plant information are provided on a further 85 similar species.

This work was prepared using the most recent literature from the best experts in the field and illustrations provided by numerous scientists, institutes and publishers around the world. It includes full identification and datasheet coverage of 25 species known to occur in Britain: *Acutaspis perseae* (Comstock), *Aonidia lauri* (Bouché), *Aspidiotus destructor* Signoret, *A. nerii* Bouché, *Aulacaspis rosae* (Bouché), *Carulaspis minima* (Signoret), *Chionaspis salicis* (L.), *Chrysomphalus aonidum* (L.), *Diaspidiotus ostreaeformis* (Curtis), *D. pyri* (Lichtenstein), *Diaspis boisduvallii* Signoret, *D. echinocacti* Bouché, *Dynaspidiotus britannicus* (Newstead), *Furchadaspis zamiae* (Morgan), *Hemiberlesia cyanophylli* (Signoret), *H. lataniae* (Signoret), *Ischnaspis longirostris* (Signoret), *Kuwanaspis pseudoleucaspis* (Kuwana), *Lepidosaphes pinnaeformis* (Bouché), *L. ulmi* (L.), *Parlatoria proteus* (Curtis), *Pinnaspis aspidistrae* (Signoret), *P. buxi* (Bouché), *P. strachani* (Cooley) and *Pseudaulacaspis pentagona* (Targioni Tozzetti).

This is the first up to date account for at least 50 years of the most economically important species of diaspidid scale found in the British Isles. Although not a complete account of the British fauna, this work will go a long way to filling the gaps in our knowledge of this fascinating group of insects. The illustrations are superb and can be zoomed in at with ease to see the fine detail necessary for positive identification. The CD is worth it just for the illustrations.

System requirements: Windows 95/98/ME, Pentium CPU, Mac OS 8.x/9.x, PowerPC CPU, 16MB RAM, 4x speed CD-ROM or higher.

JOHN BADMIN

Insect development and evolution by B. S. Heming. (Ithaca: Cornell University Press, 2003). 444pp. Hard cover £58.50. ISBN 0 8014 3933 7.

No other class of organisms on earth shows as much variation in development from immature to adult stage as the Insecta. We witness and marvel at the process of metamorphosis as a dull brown caterpillar gives rise to a brightly-coloured moth or butterfly. Over the last three decades our understanding of the underlying processes has been revolutionized by the effective application of developmental genetics and molecular biology to embryos and larvae of *Drosophila* culminating in the publication of its genome in March 2000. The discoveries of the identity and mode of action of genes specifying the development of larval and adult body plans in insects and their commonality in other organisms including humans has profound implications. This book provides a wealth of information on insect development with chapters on embryogenesis, evolution of larval forms, wing formation and pattern differentiation in butterflies, polymorphism in eusocial insects (still a lot to be discovered). The final chapter is devoted to ontogeny and hexapod evolution and provides an excellent summary account of the evolution of the various orders of insects that we know today. This is a worthy successor to *The Biology of Drosophila* (Demerec, 1965) my treasured bible for many years.

JOHN BADMIN

FIELD MEETING REPORTS

Slapton Ley, Devon, 30 August 2003

Leader: **Roy McCormick**.—Car parking spaces were at a premium as we arrived at 19.50h, as there was a bird ringing session in progress at the Field Centre and people had to park on the roadside. By the time everyone had arrived we numbered 20. Brian Bewsher brought along a fully-grown larva of *Acherontia atropos* (L.) (Death's-head Hawk-moth), that he had found in a potato field near his home at Hennock so members could see it. We then set about positioning the twelve light-traps along the various footpaths and tracks available. These were started around 21.00h on what promised to be a cold night; Mars was spotted rising above the horizon and many of the constellations could clearly be seen.

After the traps had been running for a while they were inspected, and we found there was little coming in, with more people present than moths. The trend continued with little moth activity and so it was decided to call it a night at 23.00h with the temperature at 9°C, by which time we had recorded a total of 32 species, with the best of these: one worn *Endothenia quadrimaculana* (Haw.); one *Rhodometra sacraria* (L.) (The Vestal); one very worn *Agrius convolvuli* (L.) (Convolvulus Hawk-moth); two *Peridroma saucia* (Hb.) (Pearly Underwing); one *Mythimna unipuncta* (Haw.) (White-speck Wainscot) and one *Nonagria typhae* (Thunb.) (Bulrush Wainscot). Despite the cold conditions the meeting was successful with several people seeing moths they had not encountered before.

Watersmeet, Exmoor, Devon, 1 May 2004

Leaders: **Roy McCormick** and **Barry Henwood**—The forecast for the night was rain and in North Devon that is usually the case, but four of us set out from Teignmouth and hoped for the best. After an hour and a half's journey we reached the site and found that most of the people had already arrived; though we waited until just after 20.00h before we left the meeting spot and drove down into Watersmeet to place our traps. We had to take into account the large house that is on the site (Watersmeet House) where a member of the National Trust staff lives. Sixteen people attended, including one member and his family and another member with his son; the remainder were mostly Devon Moth Group members. Thirteen traps were set out along the available tracks and started at dusk.

The main reason for the visit was to look for larvae of *Perizoma taeniata* (Stephens) (Barred Carpet), as adults were abundant at the site in the previous year and it was thought we might have a good chance of finding a larva in the wild as an indication of a breeding colony. After darkness had fallen, we searched with torches and lanterns finding larvae of *Psychoides filicivora* (Meyrick); *Elachista regificella* (Sircon); *Udea olivalis* (D.&S.); *Xanthorhoe montanata* (D.&S.), (Silver Ground Carpet); what was thought to be *Alcis repandata* (L.), (Mottled Beauty); *Noctua comes* (Hübner) (Lesser Yellow Underwing); *Noctua fimbriata* (Schreber), (Broad-bordered Yellow Underwing); what was thought to be *Xestia baja* (D.&S.) or *Diarsia brunnea* (D.&S.), (Dotted Clay or Purple Clay); *Mormo maura* (L.), (Old Lady) and *Hypena proboscidalis* (L.), (Snout) were found. Alan Jenkins found a couple of small geometrid larvae on the flower/seed heads of *Luzula sylvatica* (Woodrush) and a couple of us picked a bag of these heads to see if anything was present when we got home; a few small larvae were found and they are being bred through.

The traps were looked at after we had just about given up searching for larvae and a good number of species had come in, although despite the night being reasonably warm at 11°C with a cloud cover, there were few individuals, but we still finished up with 40 adult species with the best of these: four *Achlya flavicornis* L., (Yellow Horned); one *Eupithecia dodoneata* Guenée, (Oak-tree Pug); one *Selenia lunularia* Hübn., (Lunar Thorn); two *Lithophane hepatica* Clerck (Pale Pinion) and one *Xylena vetusta* Hübn. (Red Sword-grass). Most of us had cleared the site by around 01.00h with Peter Franghiadi, a DMG member, staying for the night; his effort produced eight more species to the list of 32 that had been recorded when we left.

Footnote: despite all our efforts, none of us managed to breed the larvae through.

Hatfield Forest, Essex, 15 May 2004

Leader: **Stuart Warrington** (SW). Twelve entomologists belonging to BENHS and Essex Field Club met by the Café in the centre of Hatfield Forest on a bright, warm spring day. Hatfield Forest is a large (450 ha) National Nature Reserve, owned by The National Trust, and is one of the best preserved medieval hunting forests in Britain. The multiple land use is to be seen in the mixed landscape of grazing lawns, coppice woodland with standards and open pasture woodland with hundreds of veteran trees. The veteran trees are mostly three to four hundred years old, although there are several trees that are considerably older. There are pollards of oak, beech, hornbeam, ash, field maple, crab apple, hawthorn, many of which support mistletoe and important epiphytic communities of mosses and lichens.

Some rare beetles were known to occur at Hatfield Forest but until the last 15 years there was surprisingly little regular recording of insects. A detailed Coleoptera survey by Tony Drane (1999–2000) focussing on the saproxylic species produced an impressive list. With so many veteran trees and with an abundance of fallen timber left to decay naturally saproxylic insects were one focus of the day.

The first exciting find was *Trichonyx sulcicollis* (Reichenbach) (Pselaphidae). Peter Hammond found this RDB2 saproxylic beetle in an ancient, hollow ash pollard with litter and powdery wood and many tree ants. This is possibly the first record for Eastern England. Further rarities found by Peter were the scarce (Na) staphylinid *Xantholinus angularis* Ganglbauer [= *X. glaber*] by sifting litter and wood from the cavity of an old pollard field maple, the RDB2 *Ischnomera caerulea* (L.) (Oedemeridae) with two adults beaten from hawthorn blossom, and five new localities for *Procræus tibialis* (Boisduval & Lacordaire) (Elateridae) RDB3, a species known from the Forest since 1973.

Peter Hammond added several more saproxylic beetles to the Forest list such as *Ptenidium gressneri* Erichson (Ptiliidae) (Notable), *Atheta liturata* (Stephens) (Staphylinidae), *Euplectus fauveli* Guillebeau (Pselaphidae) (Notable), *Symbiotes latus* Redtenbacher (Endomychidae) (Notable b) and *Hylesinus crenatus* (F.) (Scolytidae). Adding these species to those found by Tony Drane, Nigel Cuming and others lifts the Saproxylic Species Quality Index (SQI) to 595 and the Index of Ecological Continuity (IEC) to 91, thus Hatfield Forest is clearly a nationally important site for this fauna.

There are some significant marshy wetland areas, which are in good condition because the sources of water come almost entirely from within the Forest, where no fertiliser or pesticides are used. Over 100 species new to the Forest were recorded in the marsh and reedbed by the Lake, for example 21 carabid species were found in the reedbed debris. Shallow pools in the marsh lifted the water beetle total to 43 species by adding *Hydroporus angustatus* Sturm (Dytiscidae) and *Coelostoma orbiculare* (F.)

(Hydrophilidae) (by SW). *Gymnetron villosulum* Gyllenhal (Curculionidae) (Nb) was swept from the marsh by Jerry Bowdrey. Jerry also found, amongst the many galls that he identified, the galls in the capitulum of *Pulicaria* (fleabane) of the RDB3 picture-winged fly *Myopites inulaedyssestericae* Blot (Tephritidae).

Just above the marsh is an old gravel pit, a significant area of acid grassland in the clayey soils of north-west Essex. Here Jerry Bowdrey caught the metallic green and orange ground beetle *Lebia chlorocephala* (Hoffmannsegg) (Nb).

Heteroptera are often an under-recorded group and this was true for Hatfield Forest, so it was a pleasure to have Bernard Nau and Sheila Brooke along for the day. They added over 75 species from this day and a July visit, including the local *Orthops viscicola* (Puton) (Miridae) associated with mistletoe, the little pond-skater *Gerris lateralis* Schummel (Gerridae) from lakeside *Glyceria* and the nationally scarce *Psallus albicinctus* (Kirschbaum)(Miridae).

Mike Fox searched for ants (Formicidae) and found many new locations for the scarce (Nb) tree-dwelling *Lasius brunneus* (Lat.). He also added *Leptothorax acervorum* (F.), *Leptothorax nylanderi* (Forster), *Myrmica rubra* (L.) and *Myrmica sabuleti* Meinert, the latter species in the drier soils of the gravel pit and Portingbury Hills, an ancient monument with chalk soils brought to the surface. For other insect Orders, there were fewer records, but several were of interest such as Simon Damant adding the local *Xanthogramma pedissequum* (Harris) (Syrphidae) to the good list of 70 species of hoverflies compiled for the Forest by Charles Watson.

It is also important to mention that Dave Nellist and Doug Marriott found 42 species of spider on the day, of which six were new to the Forest, bringing the site total to 190 species.

This was an extremely productive day with over 500 species records submitted, including a number of nationally rare and scarce species. Hatfield Forest is a very large site and few people venture far from the central car-park and café. There are plenty of new species to find and in the western coppices you won't see anyone all day!

Rushy Meadows, Kidlington, Oxfordshire, 21 May 2004

Leaders: Paul Waring (PW) & Martin Townsend (MT).—This was the sixth and concluding meeting of the planned five year series and with it Rushy Meadows has now been visited by the BENHS to record moths and other invertebrates in every month from April to September (see references below). The meetings have spanned the first five years of a management agreement between the private land-owner and English Nature and have helped to monitor and record the results. This was an evening meeting only and was attended by seven of us, on a Friday night before a field meeting in Bernwood Forest the next day. We met at 20.00h which gave us over one hour of daylight for a good walk around the site and for beating the hedgerows for larvae before setting up light-traps. The earlier part of the week had been hot and sunny but a cold front had arrived the day before the meeting and this evening was a cool one. It proved to be a cold night too, with the air temperature falling to 4°C by 23.00h and a dew forming. Otherwise all weather factors were favourable. It was calm and dry, after a sunny day and there was only a crescent moon after dark. The Cow Parsley *Anthriscus sylvestris* (L.) was tall in the grassy verges of the bridle-way that runs from Kidlington over the canal and along the south end of the Rushy Meadows to Begbroke. The hedgerows which form the boundaries of the site and grow along the canal are predominantly *Crataegus monogyna* Jacq. (Common Hawthorn) and these were all covered in white blossom. As we entered the site we



Fig. 1. The Rushy Meadows SSSI, Oxfordshire, from the south end (Begbroke Lane), on 21 May 2004 after five years of light-grazing by cattle. (Photo: P. Waring)

were surprised to encounter a chap walking a polecat ferret on a lead but the ferret seemed to be enjoying itself, running along ahead of its owner and exploring the verges. The cow parsley on each side of the track was practically meeting across the bare earth of the centre of the track and the branches of willows and other trees arched over it, which was not the case when it was more actively used by the late farm manager Mr Jefferies, his tractor and his cattle in the 1970s (PW pers. obs.). Aesthetically, the track looks much more wildlife friendly now, but it will be shadier and damper by day as a consequence. Both Green woodpecker and Greater-spotted woodpecker were heard and seen as we climbed over the entrance gate and Song thrush, Blackbird and Robin were singing from the trees by the track.

On arrival our first objective was to beat the hedgerows for moth larvae, hoping to find in particular those of the Figure of Eight *Diloba caeruleocephala* (L.). This is a species recently reported by the Rothamsted Insect Survey to be experiencing a national decline in both abundance and distribution, according to data from the light-trapping network. The Figure of Eight was recorded annually by PW at Park Farm, adjacent to the Rushy Meadows, when he operated a light-trap there from 1976–1986. Despite beating much of the ample and accessible common hawthorn and Blackthorn *Prunus spinosa* L. in the hedgerows at this site, we found no larvae of the Figure of Eight. However, we found none of the Green-brindled Crescent *Allophytes oxyacanthae* (L.) either. This species is much more frequent in the area. The phenology of the larvae of both species is similar and PW's conclusion is that 21 May was a little too late to find them in 2004 at this site. He had earlier beaten two larvae of the Figure of Eight from Castor Hanglands NNR, Northamptonshire, on 22 April 2004, when both were 1–2 cm in length.

The most noteworthy moth larva found while beating the hedgerows on this meeting was of a Magpie moth *Abraxas grossulariata* (L.). This is another species known to be in a protracted decline which has taken place since at least the 1960s, at least in southern England where it was frequently numerous in gardens, often feeding as larvae on cultivated privet *Ligustrum* and on bushes of *Ribes nigrum* L. (Black Currant) and *R. rubrum* L. (Red Currant).

Other species of larvae beaten from hawthorn during this field meeting included the Early moth *Theria primaria* (Haw.), Winter moth *Operophtera brumata* (L.), Dotted Border *Agriopis marginaria* (Fab.), Brimstone moth *Opisthagraptis luteolata* (L.), Short-cloaked *Nola cucullatella* (L.), Common Quaker *Orthosia cerasi* (Fab.), Clouded Drab *O. incerta* (Hufn.), Dunbar *Cosmia trapezina* (L.) and Sprawler *Asteroscopus sphinx* (Hufn.). A larva of the Sallow *Xanthia iceritia* (Hufn.) was found and subsequently reared to adult on Goat Willow *Salix caprea* L. by MT.

An adult Small Yellow Underwing *Panemeria tenebrata* (Scop.) was beaten after dark from a flowering bush of Common Hawthorn standing on its own in the open sward near one of the hedges. This day-flying moth was at rest and it remained sluggish on the beating tray and was easily boxed, for examination by everyone before release back on site. Probably the moth was simply using the bush as a roosting site, but it is possible it had been feeding at the flowers by day. This is the first time the Small Yellow Underwing has been recorded from the Rushy Meadows.

Four members of the party continued beating for larvae and netting adult moths while the leaders set up a total of four Robinson light-traps in time to have them running by dusk. Lots of Green Carpet *Colostygia pectinataria* (Knoch.) were seen on the wing and netted at dusk and released again after inspection.

Once the traps were running and darkness had fallen, a brief search of the open grassy sward was made for additional species of larvae. A heavy dew was forming by now and we could see our breath condensing but these conditions did not deter a number of larvae from climbing herbs and grasses to feed nearer the growing points and in more exposed positions. Our most noteworthy finds were a single larva of the Black-neck *Lygephila pastinum* (Treit.), 3 cm in length, on Tufted Vetch *Vicia cracca* L. and a Deep Brown Dart *Aporophyla lutulenta* (D. & S.) also about 3 cm long amongst the herbage. Both were reared to adult. These are the first larval records for both species from the site. The status of the Blackneck moth on the Rushy Moors and its environs has been reported in some detail previously (Waring & Townsend, 2001). Adults were recorded on the BENHS field meetings at this site on 22 July 2000 and 15 June 2002 and five were seen on the wing at dusk by PW here on 24 June 1984. The species was only recorded occasionally at the nearby light-trap site at Park Farm (the first one in 1983). The Deep-brown Dart was recorded from the Rushy Meadows as adults on the field meeting on 23 September 2000 (Waring & Townsend, 2003a) and was trapped annually at Park Farm.

The catches in the four Robinson light-traps at midnight ranged from four to twelve moths only, and after recording and releasing them we packed the gear away and carried the traps off-site. The species comprised Green Carpet, Garden Carpet *Xanthorhoe fluctuata* (L.), Common Marbled Carpet *Chloroclysta truncata* (Hufn.), Brimstone moth, Shuttle-shaped Dart *Agrotis puta* (Hbn.), Setaceous Hebrew Character *Xestia c-nigrum* (L.), Rustic Shoulder-knot *Apamea sordens* (Hufn.), Clouded-bordered Brindle *A. crenata* (Hufn.), Flame Shoulder *Ochropleura plecta* (L.), Treble Lines *Charanyca trigrammica* (Hufn.), The Shears *Hada plebeja* (L.) and Campion *Hadena rivularis* (Fab.). We had recorded more species as larvae than in the light-traps as adults.

The condition of the sward has changed gradually over time since the first BENHS field meetings on the site in 2000. This is as a result of the low intensity cattle-grazing which has taken place as part of the management agreement between the site owner and English Nature. In the opinion of PW, the changes are for the best and have brought the site closer to the situation existing in the 1970s and early 1980s. The dominance of rushes *Juncus* spp. over much of the site has been reduced from dense blanketing stands to small clumps and the sward height is more varied and shorter than in 2000. Ragged Robin *Lychnis flos-cuculi* L. was in bloom and plentiful and Meadow-sweet *Filipendula ulmaria* (L.) was abundant, as previously. There were no cattle present on site on this visit however. Overgrazing has been avoided. Marsh Valerian *Valeriana dioica* L. is one of the wild plants for which the site is important in Oxfordshire and on 14 May 1984 PW noted that this plant was more frequent in the areas where farmer Jefferies had mown and then sprayed the rushes with MCPA herbicide in 1982 and 1983 than where the rushes were dominant and there was less grass. On that occasion the valerian was in flower and PW was able to count 20–30 flowering heads in two minutes. It would be interesting to survey the valerian again in the flowering season of 2005 for comparison.

The total number of species of macro-moths recorded from the Rushy Moors as a result of the six visits by the BENHS now stands at 166, about half the expected total of resident species. In PW's experience, an increase in light-trapping frequency, from once per month to once per week, would probably double the number of species. 98 were new to the list of 79 species compiled by PW from occasional visits during the 1980s. Of those recorded during the early 1980s, all but the following eleven were found during the BENHS meetings: Dark-barred Twin-spot Carpet *Xanthorhoe ferrugata* (Clerck), Ingrailed Clay *Diarsia mendica* (Fab.), Least Yellow Underwing *Noctua interjecta* (Hbn.), Old Lady *Mormo maura* (L.), Mottled Beauty *Alcis repandata* (L.), Sallow Kitten *Furcula furcula* (Clerck), Sandy Carpet *Perizoma flavofasciata* (Thunb.), Shoulder-striped Wainscot *Mythimna comma* (L.), Six-spot Burnet *Zygaena filipendulae* (L.), Swallow-tailed moth *Ourapteryx sambucaria* (L.) and Tawny Pinion *Lithophane semibrunnea* (Haw.). It is likely, and to be hoped, that most, if not all, of these eleven will be found given additional search effort.

During the BENHS meetings over the last five years, key species recorded in the 1980s, such as the Black-neck and Magpie moth have been found still breeding on the site and others such as the Garden Tiger *Arctia caja* (L.) and Round-winged Muslin *Thumatha senex* (Hbn.) have been seen as adults. A number of key species were discovered on the site for the first time as a result of the BENHS meetings and are important in an Oxfordshire context, including the Small Yellow Underwing, Crescent *Celaena leucostigma* (Hbn.) and Pinion-streaked Snout *Schrankia costaeistrigalis* (Steph.). Although we failed to find the Sloe Pug *Pasiphila chloerata* (Mab.) as larvae during the meeting on 12 April 2003 (Waring & Townsend, 2004), two adults were recorded to light on the meeting of 15 June 2002 (Waring, 2003). The White-legged Damselfly *Platycnemis pennipes* (Pallas) was found to have survived a past instance of pollution of the stream running through the site and was seen on the meeting on 22 July 2000, and a range of other invertebrate groups was sampled, mostly for the first time.

We trust that favourable management will be continued on this site, for the benefit of all the wildlife and, in particular, that Snipe will once again start to breed here. Hopefully, the BENHS will have opportunities to re-visit the Rushy Moors in the future. However, the programme of annual BENHS meetings will now move to Othmoor, which is another Oxfordshire wetland where PW intends to organise a series of meetings over the next five years.

The leaders would like to thank everyone who attended one or more of the meetings on the Rushy Meadows, and English Nature and the private land-owner for permission to hold these meetings. Copies of all the reports of these meetings, and the lists of species recorded, have been supplied to the Moths of Oxfordshire Recording Scheme, the Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust and the local office of English Nature. PW would like to dedicate the reports from this series of meetings to the memory of the late Angus McCrae who was a stalwart supporter of the meetings until his terminal illness prevented him attending this last of the series. Angus features in the photograph illustrating the report of the meeting of 15 June 2002 (see Waring, 2003).

REFERENCES

- Waring, P., 2003. Field meeting report—15 June 2002. Rushy Meadows SSSI, Kidlington, Oxfordshire. *British Journal of Entomology & Natural History* **16**: 253–254.
- Waring, P. & Townsend, M., 2001. Field meeting report: Rushy Meadows SSSI, Kidlington, Oxfordshire, —22 July 2000. *British Journal of Entomology & Natural History* **14**: 59–64.
- 2003a. Field meeting report—23 September 2000. Rushy Meadows SSSI, Kidlington, Oxfordshire. *Ibid.* **16**: 51–53.
- 2003b. Field meeting report—18 August 2001. Rushy Meadows SSSI, Kidlington, Oxfordshire. *Ibid.* **16**: 66–67.
- 2004. Field meeting report—12 April 2003. Rushy Meadows SSSI, Kidlington, Oxfordshire. *Ibid.* **17**: 124–126.

Dinton Pastures, Berkshire, May 22 2004

Leader: **David Wedd**—The National Moth Day/Night at Dinton Pastures proved both enjoyable and successful, and was a deserved reward for the careful planning put in jointly by BENHS and the staff of the Country Park.

The day's activities fell naturally into three sections. In the morning BENHS members spent several hours recording all branches of wildlife, and with some good all-round naturalists in the group, Hemiptera, Coleoptera, Hymenoptera, Diptera, Odonata and also birds were deemed as important as moths, so an interesting list was made. For the afternoon session the members were joined by local children and their families for a variety of activities, including pond-dipping, under the guidance of Ranger Dave Webster, which resulted in the capture of dozens of sticklebacks as well as an impressive variety of aquatic insects. The youngsters also learnt how to use butterfly nets, and to 'sweep' vegetation for larvae. There was time as well for a visit to the BENHS collections and library, and to the Park's Exhibition Room with its 'underwater world' and many paid their first (but surely not their last) visit to Dinton's delightful café.

The evening was magical. By now, plenty more families had arrived, and after switching on the various moth-traps, the large group set out on a walk across the Pastures, between Black Swan and White Swan, the Park's two biggest lakes. The swifts and hobbies that had been wheeling overhead in the daylight gave way to countless bats, visible in the dusk and then, as it grew dark, with their calls picked out in astonishing clarity by 'bat detectors'. At Middle Marsh, nightingales, Cetti's, reed and sedge warblers, blackcaps, song-thrushes and blackbirds were all singing together in unforgettable competition. We returned soon after 23.00h, and had biscuits and drinks, while BENHS Secretary John Muggleton showed slides of moths that should be flying in May. Then we inspected the traps and although John's predictions were very accurate, truth to tell the catch was disappointing. It was a cool night, and moths were outnumbered by may-bugs. This did not seem to deter



Figure 1. Members of the public pond dipping at Dinton Pastures. Photo: David Wedd.

youthful enthusiasm, however, and one had to admire the astonishing stamina of the children, some of whom had been at Dinton in non-stop activity for nearly twelve hours. Ironically, the temperature must have risen later in the night, for on the Sunday morning the two traps that had been left out overnight in the Park proved far more productive. The one at the Sailing Club alone had eight Poplar and one Eyed hawk-moth.

After such an enjoyable occasion, thanks are due to the BENHS members who loaned traps and gave their time and knowledge so freely, and to the staff of the Country Park and in particular the inexhaustible Dave Webster. We hope he enjoyed his day/night as much as we did!

Species list:

Odonata: Banded Demoiselle *Calopteryx splendens* Harris, Large Red Damselfly *Pyrhosoma nymphula* Sulzer, Common Blue Damselfly *Enallagma cyathigerum* Charp., Blue-tailed Damselfly *Ischnura elegans* Vander Linden, Red-eyed Damselfly *Erythromma najas* Hans., Broad-bodied Chaser *Libellula depressa* L.

Lepidoptera: *Micropteryx aruncella* Scop., *M. calthella* L., *Hepialus lupulinus* L., *Nematopogon swammerdamella* L., *Nemophora degeerella* L., *Adela fibulella* D. & S., *Psyche casta* Pallas (cases), *Alabonia geoffrella* L. (strong colony), *Epiphyas postvittana* Walk., *Eulia ministrana* L., *Tortrix viridana* L., Brimstone, Large White, Small White (lots), Green-veined White, Orange-tip, Small Copper, Common Blue (lots), Holly Blue, Small Tortoiseshell, Peacock, Comma, Speckled Wood (lots), *Euthrix potatoria* L. Drinker (2 larvae), *Watsonalla cultraria* F., *Cilix glaucata* Scop.,

Xanthorhoe montanata D.& S., *X. fluctuosa* L., *Epirrhoe alternata* Muller, *Ecliptopera silaceata* D.& S., *Colostygia pectinataria* Knoch, *Operophtera brumata* L. larvae, *Eupithecia vulgata* Haw., *E. abbreviata* Steph., *Lomaspilis marginata* L., *Petrophora chlorosata* Scop., *Opistograptis luteolata* L., *Selenia dentaria* F., *Agriopis aurantiaria* Hb. larvae, *Eramis defoliaria* Clerck larvae, *Menophra abruptaria* Thunb., *Smerinthus ocellata* L., *Laothoe populi* L., *Notodonta dromedarius* L., *Notodonta ziczac* L., *Calliteara pudibunda* L., *Spilosoma lubricipeda* L., *Tyria jacobaeae* L., *Nola cucullatella* L. larva, *Agrotis exclamationis* L., *Ochropleura plecta* L., *Noctua pronuba* L., *Xestia c-nigrum* L., *Lacanobia w-latinum* Hufn., *Phlogophora meticulosa* L., *Colocasia coryli* L. (1 typical, 1 melanic), *Autographa gamma* L., *Abrostola tripartita* Hufn., *Callistege mi* Clerck, *Euclidia glyphica* L.

Hymenoptera: *Monosapyga clavicornis* L., *Pemphedron lethifera* Shuckard, *Nomada goodeniana* Kirby, *Lasioglossum calceatum* Scopoli.

Aves: Hobby, Kestrel, Swift, Carrion Crow, Rook, Magpie, Robin, Coot, Moorhen, Blackbird, Song Thrush, Wood Pigeon, Tufted Duck, Mallard, Mandarin Duck, Canada Goose, Egyptian Goose, Mute Swan, Black Swan, House Sparrow, Pied Wagtail, Grey Wagtail, Greenfinch, Chiffchaff, Willow Warbler, Heron, Long-tailed Tit, Starling, Lapwing, Sedge Warbler, Blue Tit, Great Tit, Cormorant, Swallow, House Martin, Reed Warbler, Cetti's Warbler, Nightingale, Herring Gull and Black-headed Gull.

Quoditch Moor, Devon, 29 May 2004

Leader: **Roy McCormick**—Peter Franghiadi and I arrived at the site at 20.00h, to find most of the people who were coming were already there. Twelve people attended along with the owner of the site, Richard Douglas-Green and his wife. We made our way to the various habitats the site offers and set up our traps; we had twelve in all. The night was another cold one with the temperature around 11°C at dusk with a clear sky and half a moon; not at all promising. At dusk the traps were started and very little was flying at all, although we did see *Hepialus hecta* L. (Gold Swift) flying low over the grasses and one was netted. The moths eventually started to come in, but again in singles and the list built slowly, although we soon had more species than people. A couple of rounds were completed and we achieved about 40 species by 23.00h; a couple of the people then decided to leave. At around 23.30h, the temperatures were 7°C in the woodland and 5°C in the open, and as nothing new was coming in, it was decided to pack up. We finished with a total of 59 species, which included some mummified and one live Drinker larvae, with the best of the other species: two *H. hecta* (L.); one *Eulia ministrana* (L.); one *Scoparia subfusca* (Haw.); one lovely fresh male *Cyclophora albipunctata* (Hufn.) (Birch Mocha); two *Orthonama vittata* (Borkh.) (Oblique Carpet); five *Selenia lunularia* (Hübner) (Lunar Thorn); one *Paradarisa consonaria* (Hübner) (Square Spot); one *Eilema sororcula* (Hufn.) (Orange Footman); one *Lacanobia thalassina* (Hufn.) (Pale-shouldered Brocade) and one *Hadena rivularis* (F.) (Campion). We left the site soon after 00.30h, with the owner well pleased with the event and a lot of digital photographs in his camera of species seen in the traps.

Ferry Marshes, Kent, 13 June 2004

Leader: **John Badmin**—The intended objective of reaching the remote Chetney marshes on the peninsula that juts out into the Swale west of the Isle of Sheppey was unfortunately not realized. This vast expanse of low-lying marsh is privately owned

and managed primarily as a bird reserve. It is best-known as a locality where avocets breed, but little is known or has been published on the major animal groups that occur there. Without agreed access we concentrated our efforts on the adjoining Ferry marshes.

BENHS and Kent Field Club members met by Kingsferry Bridge (that joins Sheppey with the mainland) with the hot sun bearing down. The air was still and the water beautifully calm except for the occasional mini-tsunami created by high-speed motor boats as they ploughed up and down the channel towing water skiers behind them, the waves flooding across the fragile saltmarsh vegetation.

The first part of the morning was spent close to the bridge inspecting rank vegetation along both sides of the sea wall and the narrow strips of fringing saltmarsh. Heads of *Daucus carota* (Wild carrot), *Carduus tenuiflorus* (Slender thistle) and *Cirsium arvense* (Creeping thistle) proved attractive to butterflies and larger bees, while lower-flowering plants such as *Trifolium squamosum* (Sea clover, a local species) formed patches attractive to smaller insects. Small Tortoiseshell, Painted Lady and Common Blue were frequently seen, together with occasional individuals of Small Heath and Meadow Brown. We were also pleased to spot several Five-spot Burnet *Zygaena trifolii* Ver. and Yellow Shell *Campptogramma bilineata* L. flying in the sunshine.

By far the dominant bumblebee was *Bombus lapidarius* (L.) (Red-tailed bumblebee), but a few workers of *Bombus pascuorum* (Scop.) (Common carder bee) were also recorded. Parts of the area away from the bridge looked suitable for some of our rarer endangered species of coastal bee, but too few individuals were seen long enough for any positive identifications to be made, the reason being that the grass had been recently cut here and there were few flowers present to attract bees. The occasional specimens of *Sympetrum striolatum* (Charp.) (Common darter) and *Ischnura elegans* (Vander Linden) (Blue-tailed damselfly) were seen, the latter remaining faithful to the taller vegetation skirting the dykes (mainly *Scirpus maritimus*).

Laurence Clemons recorded a total of 124 insect species. Among the Diptera these included the nationally rare/scarse muscids *Phaonia fusca* (Meade) and *Dexiopsia lacustris* Karl, the chloropid *Dicraeus styriacus* (Strobl) and ulidiid *Melieria picta* (Meigen). As national scheme recorder for picture-winged flies (Tephritidae) he was disappointed not to add any records to his list on the day. He mentioned that he keeps hoping lepidopterists will begin to record this family of flies, with their distinctive wing patterns, since so little is known about their present distribution in the UK. All one needs apparently is the RES Handbook which has all the wings displayed and an enquiring mind.

Tony Allen and Roger Booth rummaged around for beetles using a variety of sampling techniques and produced a long list of species – more than 60 in total. Those with a localized distribution included *Mecinus janthicus* Germar on Common toadflax near the bridge, *Malchius vulneratus* Abeille and *Baris scolopacea* Germar from saltmarsh vegetation, *Polystichus connexus* (Fourcroy) by sieving tidal refuse and *Dolichosoma lineare* (Rossi) by sweeping. They also recorded *Bagous subcarinatus* Gyll., a Notable A aquatic weevil usually associated with *Ceratophyllum submersum* (Soft hornwort), and *Bagous collignensis* (Herbst), a RDB 3 weevil recorded from very few localities post 1969, and possibly the first recent record for Kent. Laurence also managed to find the small (Notable) weevil *Perapion limonii* Kirby.

By lunchtime we were very hot and thirsty and were attracted to a nice grassy patch beside a stretch of brackish water on the edge of Chetney marshes. Here we lunched while Tony sampled the brackish vegetation for aquatic beetles. The party then split into two, along taxonomic lines: the non-beetlers beetled back (slowly)

leaving the coleopterists to the enjoyable task of sieving through piles of wet vegetation laid out on plastic sheets.

The leader concentrated on sweeping for Hemiptera and recorded about 20 species. The common froghopper *Philæenus spumarius* (L.) was ubiquitous whereas only two individuals of *Neophilaenus lineatus* (L.) were found. Rare patches of windswept nettle supported a few individuals of *Eupteryx urticae* (F.) (no *E. aurata*), *Deraeocoris ruber* (L.) and many *Trioza urticae* (L.). Species swept from long grass included the local delphacid *Eurybregma nigrolineata* Scott, the cicadellid *Streptanus sordidus* (Zett.), and the plantbugs *Leptoterna dolabrata* (L.) and *Pithanus maerkeli* (H.-S.). *Piesma quadratum* Fieber and *Psammotettix putoni* (Thén.) were present on the saltmarshes.

All in all, we had a pleasant day and returned to our cars about 5 p.m. Before we left we had a good look at the new Sheppey bridge which should be ready for traffic in late 2005. A massive area of ground had been cleared and it will be interesting to see what effect this will have on the local fauna and flora in the near future.

A nice postscript to the day was to learn from Roger Booth that he had discovered a staphylinid, *Brundinia* sp. near *meridionalis* which has yet to be identified, but is almost certainly new to Britain.

Whiddon Down (Deer Park), Devon, 26 June 2004

Leader: **Roy McCormick**—It had been raining all day and the evening did not look promising, but the forecast said that it would clear and I, as leader, had to make an appearance. We assembled at the meeting place with a couple of the people uncertain as to how long they might stay in view of the pervading drizzle. Those who decided to remain made their way to Whiddon Deer Park, along a minor road. We entered and decided where to place our lights; and, because of the drizzly conditions opted for only two traps each.

The lights were started, the rain came down heavily, and we all rushed for cover, but five minutes later it stopped and we had no rain after that. The temperature stayed at 9–10°C for the rest of the night, despite the cloud cover clearing, and there was a fairly keen easterly wind from which we were able to shelter our traps. The direction of the cold wind kept a lot of moths down and the numbers were slow coming in, but the list built steadily and by 23.00h we had recorded approximately 60 species. We soldiered on until midnight when several members left and finally we packed up a quarter of an hour later. We finished up with 94 species with the best of these: ten *Hepialus fusconebulosa* Deg. (Map-winged Swift); two *Mesoleuca albicillata* L. (Beautiful Carpet); two *Euphyia biangulata* Haw. (Cloaked Carpet); two *Euphyia unangulata* Haw. (Sharp-angled Carpet); one *Apeira syringaria* L. (Lilac Beauty); four *Xestia ditrapezium* D.&S. (Triple-spotted Clay); 20 *Mythimna turca* L. (Double Line), one of the BAP species of the night; one *Acrionicta alni* L. (Alder Moth); two *Apamea unanimitis* Hb. (Small Clouded Brindle) and three *Plusia festucae* L. (Gold Spot). Quite a good night after all, with the people who came learning from the experience.

THE MAITLAND EMMET BENHS RESEARCH FUND

In 2001 the family of the late Lt. Col. Maitland Emmet, a distinguished amateur microlepidopterist, made a generous donation to the Society's Research Fund in his memory. As a result the Society has renamed its Research Fund the Maitland Emmet BENHS Research Fund. The Society is very grateful to the Emmet family for their generosity.

The Society invites applications for grants, from the Maitland Emmet Research Fund, to be awarded in December 2004. Awards are open to both members and non-members of the BENHS and will be made to support research on non-marine arthropods, with reference to the British fauna, and with preference given to insects, arachnids, myriapods and isopods. Grants will be given for:

- (a) the assistance of fieldwork on non-marine arthropods with relevance to their conservation,
- (b) work leading to the production of identification guides and distribution lists, but not the cost of publishing such items.

Travel to examine museum collections and to consult taxonomic specialists would be included. The work and travel is not limited to the British Isles but must have a demonstrable relevance to the British arthropod fauna. Individual grants are unlikely to exceed £500.

Preference will be given to work with a clear final objective (e.g., leading to publication or the production of a habitat management plan). Work on leaf miners and gall forming insects should be submitted to the Society's Professor Hering Memorial Research Fund.

Applicants should send seven copies, if possible, of their plan of work, the precise objectives, the amount for which an award is requested and a brief statement outlining their experience in this area of work, to **Dr J. Muggleton, 32 Penton Road, Staines, Middx, TW18 2LD**, as soon as possible and **not later than 30 September 2005**. Further information may be obtained from the same address (email: jmuggleton@compuserve.com).

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with particular emphasis on:

- (a) leaf-miners
- (b) Diptera, particularly Tephritidae and Agromyzidae
- (c) Lepidoptera, particularly Microlepidoptera
- (d) general entomology

in the above order of preference having regard to the suitability of applicants and the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary for fieldwork, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are unlikely to exceed £1000 in the year 2005.

Applicants should send seven copies, if possible, of a statement of their qualifications, of their plan of work, and of the precise objectives and amount for which an award is sought, to **Dr M. J. Scoble, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD, UK** as soon as possible and **not later than 30 September 2005**.

Applications are also invited from persons wishing to borrow the Wild M3 Stereomicroscope and fibre optics illuminator bequeathed to the Fund by the late Edward Pelham-Clinton, 10th Duke of Newcastle. Loan of this equipment will be made for a period of up to six months in the first instance.



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BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Published by the British Entomological and Natural History Society
and incorporating its Proceedings and Transactions

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British Journal of Entomology and Natural History is published by the British Entomological and Natural History Society, Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK. Tel: 01189-321402. The Journal is distributed free to BENHS members.

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Typeset by Dobbie Typesetting Limited, Tavistock, Devon.

Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

Registered charity number: 213149

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A STUDY OF GRASSHOPPER POPULATIONS IN COUNTRYSIDE STEWARDSHIP SCHEME FIELD MARGINS IN ESSEX

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ABSTRACT

Countryside Stewardship Scheme field margins have been established on large parts of the UK since 1991 in an effort to improve the environmental quality of farmland. A small scale study of grasshopper populations of 6-m wide Countryside Stewardship Scheme grass margins on a lowland farm in Essex was undertaken to ascertain whether these margins were favourable habitats for grasshoppers in comparison with other agricultural sites. Grasshopper population densities were not significantly higher in 6-m grass margins than in intensively managed agricultural habitats. The abundance of grasshoppers and species richness/assemblage diversity were reduced in later years of the scheme agreement. The authors suggest that further research is needed into the effects of initial establishment, location and management of these field margins on grasshopper abundance.

INTRODUCTION

Government agri-environmental initiatives such as the Countryside Stewardship Scheme are aimed at improving the environmental quality and biodiversity of agricultural areas (Smallshire & Cooke, 1999; Kleijn & Sutherland, 2003). However, it is not known whether such prescribed management techniques promote these aims or actually impede colonisation of grasslands by insects. A limited amount of research has been conducted on habitats created by field margins developed as part of the Countryside Stewardship Scheme and on increasing invertebrate abundance in long-term experimental plots reflecting the aims and objectives of agri-environmental policies (Haughton *et al.*, 1999; Meek *et al.*, 2002).

A study of butterfly populations on Countryside Stewardship Scheme grass margins has demonstrated that these artificial linear habitats are not favourable for species such as Large Skipper *Ochlodes venata* Bremer & Grey due to adverse management regimes and establishment of non-native aggressive grass species (Field, 2002; Field *et al.*, 2004 in press). However, a study of tenthredinid sawflies (Barker & Reynolds, 1999) found that margins lead to higher densities of larvae than cereal fields.

Orthoptera are an important invertebrate component of grassland ecosystems, particularly as prey for bird and spider species (Joern, 1986; Belovsky & Slade, 1993). However, Orthoptera on farmland have not been extensively studied in the UK. It has been thought that the abundance of grasshoppers is influenced by sward height, density and composition (Clarke, 1948; van Wingerden *et al.*, 1992; Gardiner *et al.*, 2002), although precise data on this subject in the UK are scarce.

The aim of this paper is to present the results of a small-scale study of grasshopper populations on 6-m Countryside Stewardship Scheme field margins on a lowland farm in Essex, and to assess whether these margins are favourable habitats for grasshoppers in comparison with other agricultural and conservation areas.

METHOD

Study sites

Nine study sites (A–I) were surveyed, encompassing a wide variety of habitats including 6-m Countryside Stewardship Scheme field margins, grazed pastures and hay meadows located on agricultural land at Writtle College, Chelmsford in Essex (Table 1; Figure 1). The approximate size of the College Estate is 210 hectares, mainly comprised of farmland and horticultural areas, with some designated conservation sites. A high proportion of the arable area is sown with winter cereals (wheat and barley). The estate extends over many different soil types, but most originate from glacial boulder clay and have variable pH (5.8–8.1) and high moisture content in winter (Neate, 1979). The Writtle area has a temperate climate with an annual mean air temperature of 10°C and total yearly rainfall of approximately 550 mm (Writtle College, 2003).

Sites B and D were 6-m Countryside Stewardship Scheme field margins established in 1996, the former using natural regeneration, the latter created from the existing grass ley. Field margin B was located on the northern edge of an arable field sown successively with winter beans and winter wheat during the study period. Site D extended along the eastern extremity of a field managed as grassland under the set-aside scheme. Both field margins were established on alluvial soils and were bordered by rivers which often flood in winter. The margins were cut after mid July in each year and the cuttings removed in accordance with Countryside Stewardship Scheme guidelines (MAFF, 2000).

A disused farm track situated on well drained glacial gravel was included in this study (Site I) as it represented a linear habitat not under Countryside Stewardship Scheme management. The track was used as an access route to arable fields until 1995 and was frequently traversed by vehicles thus establishing a short sward with sizeable patches of bare earth. However, since 1995 the track has had very infrequent vehicular usage. The track bordered arable fields on its northern and southern edges which were sown with winter beans, winter barley and winter wheat during the study period.

A range of intensively managed farmland habitats were also surveyed, allowing a comparison with grasshopper populations in linear field margins. These intensively

Table 1. Main characteristics of the study sites

Site	Plot	Grid Reference	Dominant habitat type	Area (m ²)	Dominant species
A	S	TL669070	Arable field	100500	<i>Hordeum</i> spp.
B	L	TL680073	CSS grass field margin	4500	<i>Lolium perenne</i>
C	S	TL664067	Lightly grazed horse pasture	3750	<i>L. perenne</i>
D	L	TL688071	CSS grass field margin	4320	<i>L. perenne</i>
E	S	TL674068	Heavily grazed cattle pasture	10600	<i>L. perenne</i>
F	L	TL672069	Hay meadow	11250	<i>L. perenne</i>
G	S	TL675069	Set-aside grassland	30000	<i>Phleum pratense</i>
H	S	TL663068	Heavily grazed sheep pasture	10100	<i>L. perenne</i>
I	L	TL663073	Disused farm track	750	<i>Agrostis stolonifera</i>

S = standard plot (10 × 10 m).

L = linear plot (5 × 20 m).

CSS = Countryside Stewardship Scheme.

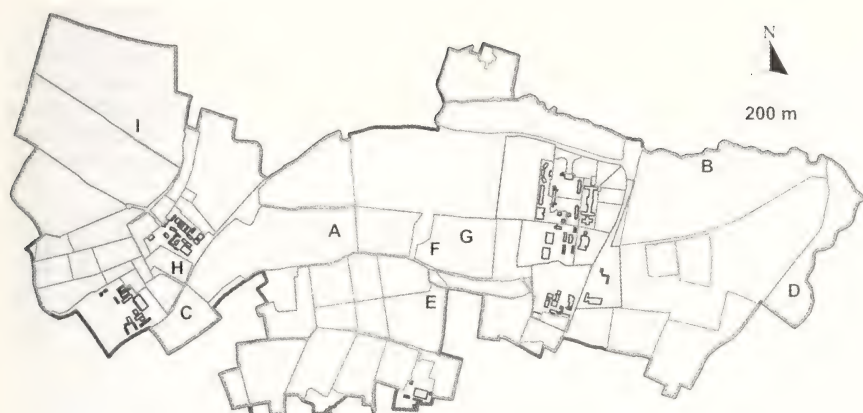


Fig. 1. Location of the study sites on the Writtle College Estate.

managed habitats included an arable field (Site A – winter barley) and heavily grazed pastures (Sites E and H), all of which received inorganic fertiliser applications during the study.

Sampling method for grasshopper populations

The method used for surveying grasshoppers in this study is published in Gardiner *et al.* (2002). The size of the quadrats used in the survey was 4 m^2 ($2 \times 2\text{ m}$). Ten quadrats were positioned at random in a 100 m^2 plot at each study site. The corners of each quadrat were marked using poles without the observer disturbing the grasshoppers within by casting shadows. Two types of plot were used: a standard $10 \times 10\text{ m}$ plot and a plot of $5 \times 20\text{ m}$ for linear grasslands such as field margins where it was impossible to accommodate the former plot. Each plot at the study sites was surveyed to ascertain grasshopper abundance and species richness once in July and once in August, in both 2000 and 2001. Only adult grasshoppers were recorded in this study, because during this life stage, identification can be confirmed without the need for capture of individuals (Richards & Waloff, 1954).

The numbers of adult individuals of each species were recorded by visual sighting in each quadrat. The vegetation of each quadrat was brushed with a pole to cause any grasshoppers present to jump (Richards & Waloff, 1954). This 'flushing' of grasshoppers was conducted in a standardised method ensuring coverage of the whole quadrat by moving from one edge to the other, sweeping the vegetation in an 180° arc. Only grasshoppers within the quadrat at the start of the sweep were recorded. One observer conducted all of the grasshopper surveys to minimise any recording error. The surveys were undertaken between 1045 and 1545 hours, if the air temperature was 17°C or above (Marshall & Haes, 1988; Pollard & Yates, 1993). Total and individual species densities per m^2 were calculated for each site by combining the data collected in both years.

Statistical analysis of habitat preferences and assemblage diversity

Relationships between the densities per m² of each grasshopper species at each of the nine sites were tested using the Kruskal–Wallis multiple comparison statistic (Heath, 1995) to investigate habitat preferences. For ease of analysis, abundance data for each site were pooled for 2000 and 2001. Dunn's non-parametric procedure (Gardiner, 1997) was used to determine significant differences in grasshopper density between sites.

Species Diversity and Richness (Version 3.02) software (Pisces Conservation Ltd, IRC House, The Square, Pennington, Lymington, Hampshire) was used to analyse the assemblage diversity for each of the study sites. The Shannon–Wiener diversity Index (H') (Kent & Coker, 1992) was calculated for each site using the total number of individuals recorded for each grasshopper species (2000 and 2001 data combined).

Changes in grasshopper abundance and assemblage diversity during margin establishment

To study the colonisation of the two Countryside Stewardship Scheme margins by grasshoppers (Sites B and D), the authors surveyed the margins at three (1999), five (2001) and seven (2003) years after establishment, using the standard 2 × 2 m quadrat methodology outlined previously. Additionally, a control plot was established in a lightly grazed pasture (Site C) to determine how grasshopper populations fluctuated in the wider countryside. In all three years, grasshoppers were counted in at least 10 randomly located quadrats at each site. The Shannon–Wiener diversity Index (H') was calculated for each of the sites in all three years of the agreement using the total number of individuals recorded for each grasshopper species.

RESULTS AND DISCUSSION

Habitat preferences of grasshoppers

The most frequently observed acridid in this study was Lesser Marsh Grasshopper *Chorthippus albomarginatus* De Geer accounting for 69% of total sightings for 2000 and 2001 combined (219 observations). Meadow Grasshopper *Chorthippus parallelus* Zetterstedt and Field Grasshopper *Chorthippus brunneus* Thunberg were rarer on the College Estate with approximately 31% (98 observations) and 1% (1 observation) of all sightings respectively for 2000 and 2001 combined. *Chorthippus albomarginatus* is often found in inland areas beside rivers in flood meadows and wetlands in the UK (Haes & Harding, 1997) and this may explain its presence on Countryside Stewardship Scheme field margins at the study site (Table 2). *Chorthippus brunneus*, however, prefers dry habitats with sparse vegetation (Marshall & Haes, 1988) which are infrequent habitats at the study site.

All three grasshopper species were recorded at only one study site in 2000 and 2001 (lightly grazed pasture, Site C), whereas at five sites, which included both the Countryside Stewardship Scheme field margins (Table 2), two species (*C. albomarginatus* and *C. parallelus*) were recorded. *Chorthippus albomarginatus* was not recorded in intensively managed agricultural habitats such as arable fields (Site A) or heavily grazed pasture (Site H), suggesting that field margins may provide a valuable refuge for this species in areas of intensively managed farmland. Assemblage diversity in both field margin sites was higher than in two intensively managed habitats (Sites A and H; Table 2) indicating that these grass margins had a

Table 2. Adult density per m² of three *Chorthippus* species and assemblage diversity (H') for 2000 and 2001 combined

Site	Combined Density	<i>C. albomarginatus</i>	<i>C. brunneus</i>	<i>C. parallelus</i>	Diversity (H')
I	1.45 (232)	1.08 ^a (173)	0.00 ^a (0)	0.37 ^a (59)	0.57
C	0.35 (56)	0.21 ^b (34)	0.01 ^a (1)	0.13 ^b (21)	0.74
F	0.09 (14)	0.03 ^c (4)	0.00 ^a (0)	0.06 ^{bc} (10)	0.60
B*	0.06 (9)	0.03 ^c (4)	0.00 ^a (0)	0.03 ^c (5)	0.69
D*	0.03 (4)	0.02 ^c (3)	0.00 ^a (0)	0.01 ^c (1)	0.56
E	0.02 (2)	0.01 ^c (1)	0.00 ^a (0)	0.01 ^c (1)	0.69
A	0.01 (1)	0.00 ^c (0)	0.00 ^a (0)	0.01 ^c (1)	0.00
G	0.00 (0)	0.00 ^c (0)	0.00 ^a (0)	0.00 ^c (0)	0.00
H	0.00 (0)	0.00 ^c (0)	0.00 ^a (0)	0.00 ^c (0)	0.00

() values indicate sample size.

* Countryside Stewardship Scheme 6-m field margin.

Significant differences at $P < 0.05$ between grasshopper densities within columns are denoted by different superscripts – Kruskal–Wallis test.

positive effect on the diversity of grasshoppers at the study site. However, due to the low numbers of grasshoppers recorded at some of the study sites, the species richness and assemblage diversity data should be viewed with some caution. A higher number of species and recorded individuals are required to fully elucidate the effect of field margins on grasshopper assemblage diversity.

Field margins had little impact on grasshopper density. For example, *C. albomarginatus* was more numerous on lightly grazed pasture (Site C) and the disused farm track (Site I) than on any of the other survey sites ($P < 0.05$; Table 2). *Chorthippus albomarginatus* was recorded in very low numbers in the two grass field margins that were established in an effort to enhance farmland biodiversity in the area under the UK Government's Countryside Stewardship Scheme. However, densities of this species were not statistically different in these two field margins than in the intensively managed agricultural habitats such as Sites A and H.

Densities of *C. parallelus* were particularly low in intensively managed agricultural habitats such as Sites A and H, sites which were also not favoured by *C. albomarginatus* or *C. brunneus*. In a similar fashion to *C. albomarginatus*, densities of *C. parallelus* were not statistically different on the two Countryside Stewardship Scheme grass field margins than in the more intensively managed farmland sites such as heavily grazed pasture (Sites E and H) or arable fields (Site A). *Chorthippus brunneus* was absent from intensively managed pastures (Sites E and H) and Countryside Stewardship Scheme grass field margins in 2000 and 2001 (Sites B and D).

The two grass field margins in this study were established with funding from the UK Government's Countryside Stewardship Scheme. The aim of the Countryside Stewardship Scheme is to maintain and enhance wildlife and other landscape features (Smallshire & Cooke, 1999; Peach *et al.*, 2001). Uncultivated grass field margins have been created over large parts of Britain under such agri-environmental schemes. However, this study provides some evidence that grasshopper populations in these margins are no higher than in intensively managed agricultural land. This may be due to both field margins being situated adjacent to habitats (arable fields and set-aside grassland) which, in this study, had low grasshopper populations. Colonisation of margins in such isolated locations is therefore likely to be slow and it may take

many years for grasshoppers to attain large populations. The authors suggest that the large populations of both *C. albomarginatus* and *C. parallelus* at Sites C and I reflect the maturity of the grassland swards at these sites. Historical records show that both sites have had continuous grassland cover for at least 10 years allowing grasshoppers to colonise and sustain large populations.

Soil type and sward composition may also be important factors in the colonisation of field margins by grasshoppers. For example, both field margins were located on moist, nutrient rich, alluvial soils that promoted the growth of grass species such as Perennial Rye-grass *Lolium perenne* L. which dominated in both margins (Table 1). Gardiner *et al.* (2002) suggest that this grass species produces an unfavourable habitat for grasshoppers on fertile soils, perhaps because it forms a tall and dense sward with a 'cold' microclimate (van Wingerden *et al.*, 1991). Contrastingly, the disused farm track (Site I) which was located on well drained soil, had an abundance of the fine-leaved grass species, Creeping Bent *Agrostis stolonifera* L., which may provide a short, sparse sward with a favourable 'warm' microclimate, ideal for sustained grasshopper activity.

Changes in grasshopper abundance and species richness/diversity during margin establishment

The Countryside Stewardship Scheme margins in this study were poor habitats for grasshoppers in comparison with other agricultural areas. There is also evidence from this study that the grasshopper populations declined in size over the course of the 10-year Countryside Stewardship Scheme agreement for both margins (Sites B and D; Figure 2). However, grasshopper populations in the lightly grazed control plot (Site C) actually increased.

In the 6-m margin established from a *L. perenne* grass ley (Site D) there were initially quite high grasshopper densities (three years after establishment). However, as the margins matured, in years five and seven of the agreement, grasshopper densities were much reduced. There was also a decline in species richness of grasshoppers and assemblage diversity in the margins. All three *Chorthippus* species were recorded three years after establishment in both margins, however, after seven years of the College Stewardship agreement only *C. parallelus* was recorded at Site B, whereas both *C. albomarginatus* and *C. parallelus* were observed at Site D. *Chorthippus brunneus* was not sighted in either margin seven years after establishment, perhaps due to the absence of short, open vegetation in the mature margins, that this species requires (Haes & Harding, 1997).

The decline in species richness was reflected by assemblage diversity which was high at both field margin sites three years after establishment (H' values; Site B = 0.95, Site D = 0.87), but much lower seven years after establishment (H' values; Site B = 0.00, Site D = 0.50). In contrast, assemblage diversity in the control area (Site C) increased (H' values; year three of agreement = 0.43, year seven of agreement = 0.58).

It is suggested that the reduced populations of grasshoppers and reduced species richness/diversity in later years of the agreement were due to the annual cutting of the margins for hay in August. This management removed the entire grassland habitat in one event, leaving only a very short sward (< 100 mm in height) that was unfavourable for adult grasshoppers (Gardiner *et al.*, 2002). Consequently, after cutting, grasshoppers may have dispersed into the surrounding areas in search of tall vegetation which provides more shelter from inclement weather and avian predation than the mown field margin.

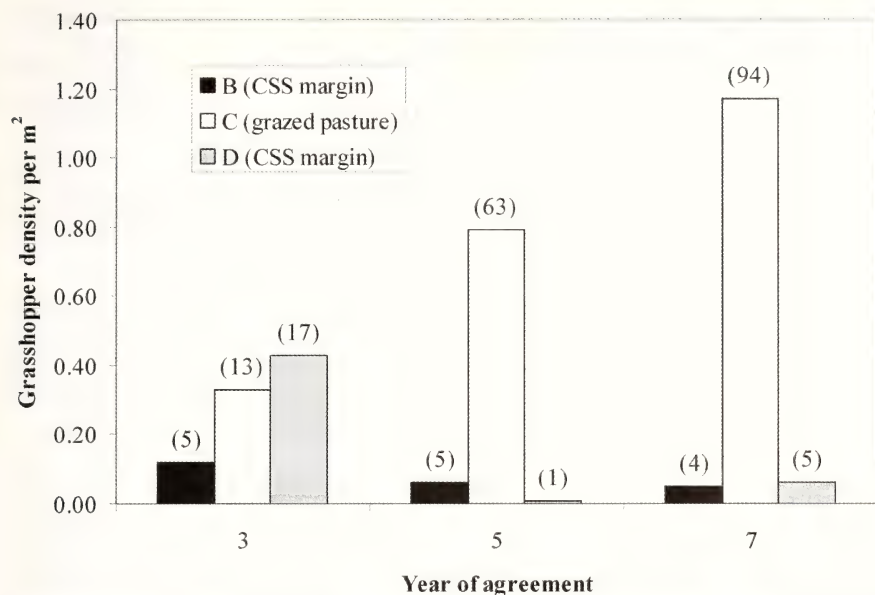


Fig. 2. Changes in total adult grasshopper density in two Countryside Stewardship Scheme (CSS) field margins (Sites B and D) and a control plot (Site C) over the course of the Writtle College CSS agreement. () denotes sample size.

This small scale study suggests that 6-m Countryside Stewardship Scheme field margins may not be a particularly favourable habitat for grasshoppers, as population densities were no higher than in intensively managed agricultural areas (Table 2). However, other authors such as Barker & Reynolds (1999), suggest that field margins provide a valuable habitat for insects such as sawflies in intensively farmed areas. The number of insect species in field margins is likely to be high and management that favours grasshoppers may not be suitable for other insect groups. For example, grasshoppers prefer relatively short, open swards of 100–200 mm in height (Gardiner *et al.*, 2002), which may not be suitable for Heteroptera that are most numerous in taller swards (Morris, 1979). It is clear that field margins should possess a wide range of vegetation heights and floristic composition to satisfy the ecological requirements of as many different insect groups as possible.

Field margins have the potential to develop into a wide variety of grassland habitats depending on plant species composition, history of land use, location, soil type, and the seed mixture used during establishment. More quantitative research is therefore required to substantiate whether Countryside Stewardship Scheme field margins provide favourable habitats for grasshoppers.

REFERENCES

- Barker, A. M. & Reynolds, C. J. M. 1999. The value of planted grass field margins as a habitat for sawflies and other chick-food insects. In: Boatman, N. D., Davies, D. H. K., Chaney, K., Feber, R., de Snoo, G. R. & Sparks, T. H. (eds) *Field margins and Buffer Zones: Ecology, management and policy*. Association of Applied Biologists, Warwick, pp. 109–116.

- Belovsky, G. E. & Slade, J. B. 1993. The role of vertebrate and invertebrate predators in a grasshopper community. *Oikos* **68**: 193–201.
- Clarke, E. J. 1948. Studies in the ecology of British grasshoppers. *Transactions of the Royal Entomological Society of London* **99**: 173–222.
- Field, R. G. 2002. *A Study of Butterflies on Farmland*. Unpublished PhD Thesis, University of Essex, Colchester.
- Field, R. G., Gardiner, T., Mason, C. F. & Hill, J. 2004 in press. Agri-environment schemes and butterflies: the utilisation of six metre arable field margins. *Biodiversity & Conservation*.
- Gardiner, T., Pye, M., Field, R. & Hill, J. 2002. The influence of sward height and vegetation composition in determining the habitat preferences of three *Chorthippus* species (Orthoptera: Acrididae) in Chelmsford, Essex, UK. *Journal of Orthoptera Research* **11**: 207–213.
- Gardiner, W. P. 1997. *Statistics for the Biosciences*. Prentice Hall, Hemel Hempstead.
- Haes, E. C. M. & Harding, P. T. 1997. *Atlas of Grasshoppers, Crickets and Allied Insects in Britain and Ireland*. The Stationery Office, London.
- Haughton, A. J., Bell, J. R., Gates, S., Johnson, P. J., Macdonald, D. W., Tattersall, F. H. & Hart, B. H. 1999. Methods of increasing invertebrate abundance within field margins. In: Boatman, N. D., Davies, D. H. K., Chaney, K., Feber, R., de Snoo, G. R. & Sparks, T. H. (eds) *Field Margins and Buffer Zones: Ecology, management and policy*. Association of Applied Biologists, Warwick, pp. 163–170.
- Heath, D. 1995. *An Introduction to Experimental Design and Statistics for Biology*. UCL Press, London.
- Joern, A. 1986. Experimental study of avian predation on coexisting grasshopper populations (Orthoptera: Acrididae) in a sandhills grassland *Oikos* **46**: 243–249.
- Kent, M. & Coker, P. 1992. *Vegetation Description and Analysis: A practical approach*. John Wiley & Sons, Chichester.
- Kleijn, D. & Sutherland, W. J. 2003. How effective are European agri-environment schemes in conserving and promoting biodiversity? *Journal of Applied Ecology* **40**: 947–969.
- MAFF 1990. *The Countryside Stewardship Agreement: Information and how to apply*. MAFF, London.
- Marshall, J. A. & Haes, E. C. M. 1988. *Grasshoppers and Allied Insects of Great Britain and Ireland*. Harley Books, Colchester.
- Meek, B., Loxton, D., Sparks, T., Pywell, R., Pickett, H. & Nowakowski, M. 2002. The effect of arable field margin composition on invertebrate biodiversity. *Biological Conservation* **106**: 259–271.
- Morris, M. G. 1979. Responses of grassland invertebrates to management by cutting II. Heteroptera. *Journal of Applied Ecology* **16**: 417–432.
- Neate, D. J. M. 1979. *Writtle Agricultural College Wildlife and Landscape Survey: Report and recommendations*. Writtle College, Chelmsford.
- Peach, W. J., Lovett, L. J., Wotton, S. R. & Jeffs, C. 2001. Countryside stewardship delivers cirl buntings (*Emberiza cirlus*) in Devon, UK. *Biological Conservation* **101**: 361–373.
- Pollard, E. & Yates, T. J. 1993. *Monitoring Butterflies for Ecology and Conservation*. Chapman & Hall, London.
- Richards, O. W. & Waloff, N. 1954. Studies on the biology and population dynamics of British grasshoppers. *Anti-Locust Bulletin* **17**: 1–182.
- Smallshire, D. & Cooke, A. I. 1999. Field margins in UK agri-environment schemes. In: Boatman, N. D., Davies, D. H. K., Chaney, K., Feber, R., de Snoo, G. R. & Sparks, T. H. (eds) *Field Margins and Buffer Zones: Ecology, management and policy*. Association of Applied Biologists, Warwick, pp. 19–28.
- van Wingerden, W. K. R. E., Musters, J. C. M. & Maaskamp, F. I. M. 1991. The influence of temperature on the duration of egg development in west European grasshoppers (Orthoptera: Acrididae). *Oecologia* **87**: 417–423.
- van Wingerden, W. K. R. E., van Kreveld, A. R. & Bongers, W. 1992. Analysis of species composition and abundance of grasshoppers (Orth., Acrididae) in natural and fertilized grasslands. *Journal of Applied Entomology* **113**: 138–152.
- Writtle College 2003. *Writtle College Annual Weather Report 2003*. Writtle College, Chelmsford.

THE HISTORY, ECOLOGY AND CURRENT STATUS OF THE BRIGHTON WAINSCOT *ORIA MUSCULOSA* (HÜBNER) (LEPIDOPTERA: NOCTUIDAE): IS THIS SPECIES ON THE VERGE OF EXTINCTION IN THE UNITED KINGDOM?

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ABSTRACT

The history of the Brighton Wainscot *Oria musculosa* (Hübner) and its decline are discussed. A county by county chronology is presented. Recent records, along with a measure of recording effort, are given. The life cycle and ecology are covered and possible reasons for the moth's decline explored.

INTRODUCTION

Early in 1998 the British Entomological & Natural History Society's (BENHS) Conservation Working Group (CWG) produced a short list of species of macro-moths to which it felt that the Society could contribute to their conservation (Phillips & Dobson, 1998). Included in this listing was the Brighton Wainscot *Oria musculosa* (Hübner) as there was 'Some evidence of decline; possibly due to changes in agricultural practices?' (Phillips & Dobson, *loc. cit.*). Phillips (2000) again raised the opportunity for BENHS members to contribute to the conservation of this and other UK Biodiversity Action Plan (UK BAP) species.

The Brighton Wainscot (Fig. 1) was considered nationally scarce (Notable B, estimated to occur in between 31 and 100 10 km squares of the National Grid) in Hadley (1984). Waring (1999) graded the species Notable A (thought to occur in 30 or fewer 10 km squares) and just four years later Waring, Townsend & Lewington (2003) treated the Brighton Wainscot as a provisional Red Data Book species.

The species was listed on the Medium List of the UK BAP (UK Biodiversity Group, 1995) and a formal Action Plan was published in 1999 (UK Biodiversity Group, 1999). Within this plan it was stated that 'Since 1980 it [the Brighton Wainscot] has been reported from less than 25% of the ten km squares with previous records' and suggested factors causing decline could probably be attributed to changes in farming practices, including choice of crops and the time of sowing, along with the use of insecticides. The Plan lists a range of actions involving several organisations with the dual aim of maintaining populations at all known sites and maintaining 20 viable populations within the known range. The plan stipulated undertaking surveys to determine the status of the species. Butterfly Conservation (BC) was given the Lead Partner role for this Plan.

In 1999, Butterfly Conservation, with contributory funding from English Nature, employed full-time staff on *The Action for Threatened Moths Project* (Parsons *et al.*, 2000). A major part of the role of this project was to oversee the implementation of the Action Plans for the UK BAP moths for which BC is Lead Partner. At this time, the BENHS Conservation Working Group offered to assist specifically with the investigation of the requirements and distribution of three species, one being the Brighton Wainscot. The project that was developed, supplementing the work of BC, was envisaged as a three year survey programme and also included a questionnaire (prepared by JWP) that was sent to a few farmers on Salisbury Plain. This



Fig. 1. The Brighton Wainscot *Oria musculosa* Photo: D.G. Green, Butterfly Conservation.

questionnaire aimed to determine farming practices in the area. The project has been ongoing since 2000. This paper summarises both this effort and our knowledge of the species in Great Britain.

HISTORY AND DISTRIBUTION

The Nineteenth Century Records

Pratt (1999) comprehensively covers the history of this moth in Sussex. This can be summarised chronologically as follows:

1843—First known British capture by a Mr Lambert at Brighton.

1855—On 17 August, a local surgeon, J.N. Winter, took a perfect male example at a gas lamp inside the Sussex County Hospital on the outskirts of Brighton. At this time, the hospital was probably surrounded by open downland and large fields of cereals. The moth was then named “the Brighton Wainscot” (Fig. 2).

1856—Two specimens were taken, one of these in the middle of Brighton town, the other probably from the Hospital site.

1857—One example at the Hospital on 26 July.

1858—Four found in the Brighton area.

Following years up until about 1860—about 20 examples seen in the Brighton area.

After 1860, it would seem that the moth had very nearly died out in this area, with a singleton recorded in 1883 at Brighton. The final report coming in 1899 when a specimen was obtained at Devil’s Dyke, Brighton.



Fig. 2. *The Entomologist's Annual 1856*—Page 46—Rare British species captured in 1855. *Synia musculosa* (Frontispiece Fig. 3): a specimen of this pretty rarity was taken by Mr Winter on a gas-light at Brighton—17 August. Reproduced by kind permission of Dr. S. Legg, Booth Museum of Natural History, Brighton.

The moth was also reputedly captured at Bexhill in the mid 1870s (probably 1876 and/or 1877). At least six specimens were auctioned with this provenance.

The species has been presumed extinct in the county since the Devil's Dyke capture. There have been several subsequent reports, e.g. Brighton (between 1944 and 1962), Cadborough (1968), Northiam (1981 and 1982), Udimore (1996), but none of these have been confirmed and consequently all have been rejected. There was also an attempt to re-establish the moth in Sussex. In 1952 about a dozen Wiltshire moths were released into a wheat field near Brighton. This establishment attempt was unsuccessful.

The only other accepted 19th century records are from Wye, Kent, where a single example was recorded in 1881 (Chalmers-Hunt, 1962–1970) and a single example from south Devon in 1899 (McCormick, 2001).

The Twentieth Century Records

Table 1 summarises the history of the Brighton Wainscot on a county basis. The moth has been recorded from Wiltshire, Hampshire, Buckinghamshire, Berkshire, Oxfordshire during the twentieth century, with single or a few examples/records also from each of Dorset, Gloucestershire, Isle of Wight, Northamptonshire, Somerset and Surrey. The headquarters of the species in the mid twentieth century has generally been considered to be central southern England, particularly the Salisbury Plain area.

No up-to-date county list is available for Wiltshire, although in 1962 C.G.M. de Worms produced *The Macrolepidoptera of Wiltshire*. It is of interest to note in this publication that de Worms referred to *O. musculosa* as the "Downland Wainscot". Why this was the case seems to be something of a mystery, though presumably it reflected its habitat and he felt that the original name was by then somewhat inappropriate!

de Worms (1962) states that this species was "Now found to be very widespread in Wiltshire where it was originally discovered at Salisbury in 1909 by the late Harry Haynes". In total, six individuals were found in 1909 by Haynes. Other individuals were found in 1910 (3), 1911 (1), 1929 (1), 1932 (1) and another single example was said to have been taken in 1938, but it was not until 1939 that the species was proved to be well established in the wheat fields on the plain north of Salisbury (Cockayne & Kettlewell, 1940). Bearing in mind the 1909 and subsequent records, there is every possibility that it was well established before this time.

South Wiltshire subsequently produced the majority of the records with sightings from wheat fields on the northern outskirts of Salisbury (1940, 1941 & 1942 – common); Shrewton (abundant in 1940); Trowbridge (1948 – 1 individual); Clarendon (1948 & 1949); Pepper Box Hill (1949); Codford (almost annually, notably 1951, 1954 and 1955); Salisbury (1954); Chitterne (sometimes abundant, including 12 on 30 July 1955); West Lavington (22 seen on 3 August 1959) and also reported from Camp Hill near Stratford; Larkhill (common); and Tilshead (sometimes abundant) (de Worms, *loc. cit.*), including heavy infestation in 1951 (Jackson, 1952). It is interesting to note that Jackson (*loc. cit.*) reports that the moth was still to be found in its old headquarters north of Salisbury, but possibly not in the numbers in which it occurred during the war. The moth was still reported from several sites and, occasionally plentifully, from the Tilshead area during the 1960s, e.g. Harper (1963), and the 1970s, e.g. Brown (1976). During the 1980s, it was seen in a few sites, including Tilshead, and primarily from the Tilshead area in the 1990s (see Appendix 1). The species was last recorded from the county in the Tilshead area in 2001 (see below and Appendix 2).

Table 1. Summary of the history of the Brighton Wainscot on a county basis.

County	Date range	Notes/Source(s)
Sussex	1843 to 1899	See history above (Pratt, 1999).
Kent	1881	A single example at Wye. There are also two records one from Pittard near Darenth Wood (undated, but 19th century) and one from Wye Downs (1885), however these are both considered questionable (Chalmers-Hunt, 1962–1970).
Devon	1899	A single example in South Devon (McCormick, 2001).
South Wiltshire	1909 to 2001	(de Worms, 1962). Last records: 27 July 2001 (a single example, B. Fox) and 3 August 2001 (two, D. Green/J. McGill) (Fox, 2002).
Surrey	1925 to 1976	Noted in 1925 (a singleton); 1951; 1953; 1956 (2 sites); 1970; 1971; 1976 (a singleton) (Collins, 1997).
North Hampshire	1933 to 1983	(Goater, 1974 & 1992).
South Hampshire	1935 to 1976	(Goater, 1974 & 1992).
Buckinghamshire	1938 to 1976	Ansorge (1969) and M. Albertini (pers. comm.).
Somerset	1955 to 1976	1955, Weston-Super-Mare (C.S.H. Blathwayt) (Turner, 1955); 1956, Curry Rivel (G. Ford) (J. McGill, pers. comm.); 5 July 1976, a single example, Weston-Super-Mare (K. Poole) (J. McGill, pers. comm.). There is also a record from 1945 of an example found on a car radiator, the car having just made a journey from Burnham-on-Sea to Bristol and back (Heslop, 1945).
Berkshire	1950 to 1981	(Baker, 1994) and NSMRS.
North Wiltshire	1951 to 1953	(de Worms, 1962).
Isle of Wight	1952	A single example, Freshwater Marsh (Goater, 1974).
Gloucestershire	1953 & 1970	Single examples, Bourton-on the Water (1953) and Tetbury (1970) (Newton & Meredith, 1984).
Dorset	1959 to 1971	Single examples at Iwerne Minster, 24 August 1959 and 5 August 1963 (P. Davey, pers. comm.); 1971, two, Over Compton (N. Greatorex-Davies, pers. comm.).
Oxfordshire	1962 to 1973	J. Campbell and M. Townsend (pers. comm.), also Hugo (1974). There is a record from BRC for post 1961 and one on the NSMRS database for 1918 which has not been confirmed.
Northamptonshire	1970	A single example, 9 August, edge of Salcey Forest (C.C. Smith) (J. Ward, pers. comm.). There is also an undated, though post 1944 report in South (1961). No further details of this record have been traced.

Doubtful county records

Shropshire	undated	South (1961). Record considered doubtful, not included in Riley (1991).
Hertfordshire/ Bedfordshire/ Cambridgeshire	1961 onwards	There are records for 1961 onwards for grid squares TL11 and TL24 on the map in UK Biodiversity Group (1999). These records are on the NSMRS database, giving the BRC as the source. There are no cards at BRC to support these records (H. Arnold, pers. comm.) and therefore these records are treated as dubious.

In North Wiltshire there are records from Holt (1951); Ramsbury (1953); Marlborough (1957) (de Worms, *loc. cit.*); and also Alton Barnes (1951 – in numbers) (Jackson, *loc. cit.*). Surprisingly, no later records have been traced.

Goater (1974) suggests that the species spread from Wiltshire into Hampshire, being first recorded in the county at Micheldever in 1933. The moth was occasionally recorded commonly during the 1960s, e.g. 150 recorded at MV light by D.H. Sterling at Worthy Down in 1968. The species got scarcer in the county during the 1970s particularly after about 1976. It was last recorded in 1983 at Burghclere (Goater, 1992).

In Berkshire, it was considered that the moth had spread into the county from north Hampshire (Baker, 1994), possibly from as early as the late 1940s. The moth became common on at least one or two sites, for example over 50 were seen at East Garston between 31 July and 6 August 1970. The moth was recorded as common at Chieveley in 1978 (Baker, *loc. cit.*), but by 1982 it had been apparently lost to the county.

Ansorge (1969) states that "There are few records of its [Brighton Wainscot] occurrence in Buckinghamshire". The moth appears to have been first recorded in 1938 at Eton (Ansorge, *loc. cit.*) with other records from Fawley and Medmenham, both in 1962. Harman (1963) referring to Medmenham, suggests that the species was "in my opinion, breeding within a mile of here". Subsequently, it was reported on the Chilterns in 1966 (Harman, 1967) given as "the third I had seen in the county", and again in 1970 (Harman, 1971) and also seen at Bletchley in the same year (Ellerton, 1970), Turville Heath area (in 1971) and last recorded at Marlow in 1976 (M. Albertini, pers. comm.).

Many of the available records require further clarification but suggest that the moth was never resident in Oxfordshire, although it may have been overlooked, given the possible breeding in Buckinghamshire. The moth seems to have been first recorded in the county in 1962 (at SP5804), although the Biological Records Centre (BRC) has a record for post 1961 from near Henley-on-Thames and there is a also record on the National Scarce Moth Recording Scheme (NSMRS) from 1918 for Waterperry Wood. In 1964 the moth was found at Studley. The last record that can be traced is from Chipping Norton in 1973 (Hugo, 1974).

There are several other counties with just one or a few records. A few of these may possibly be explained through immigration (which may also account for at least one or two of the nineteenth century records), although the paucity of coastal records suggest that at most this is a very infrequent immigrant. Other records may be the result of wanderers or strays from the main populations in central southern England. It is worth noting that six Brighton Wainscot have been found at a ship 1.5 miles (2 km) off the coast of Cyprus showing that they do at least wander some distance from where they emerge (Darlow, 1951).

The Decline

The Brighton Wainscot's "hay-day" in this country was probably during the late 1930s and 1940s, but it still occurred regularly and sometimes commonly up until the late 1970s. It was occasionally noted in numbers during the 1980s and early 1990s, but these records all seem to refer to one site: north of Tilshead. All records that we have been able to research from 1980 to 1999 are given in Appendix 1. Three of these are from Berkshire, one from North Hampshire, the remaining records coming from Salisbury Plain in South Wiltshire. Although the majority of these are from the Tilshead area, particularly since 1990, this could reflect the recording effort being concentrated on this site, as this was a widely known site for the species amongst lepidopterists.

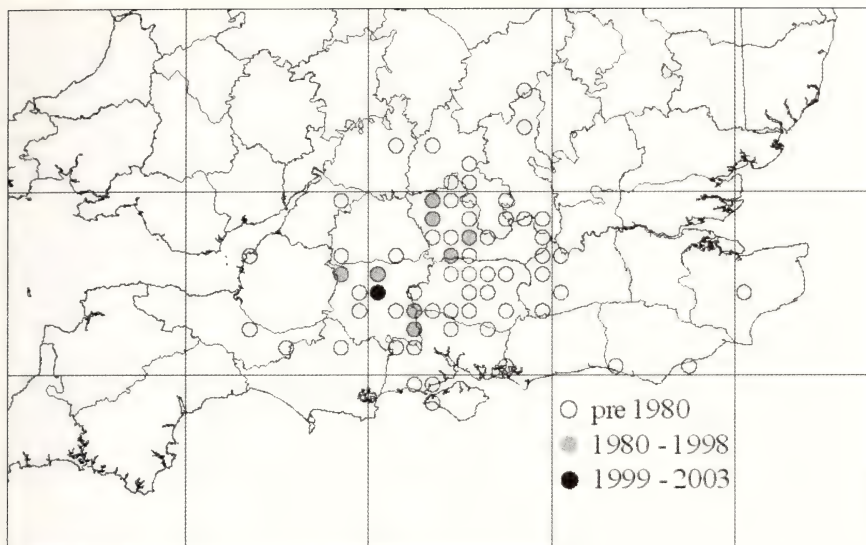


Fig. 3. Distribution of the Brighton Wainscot *Oria muscosa* in southern England. Map produced using MapMate (Teknica Ltd.).

Survey effort during the recent project (2000–2003) concentrated on Salisbury Plain again centring on Tilshead. The BENHS, along with BC, organised trapping sessions as part of a comprehensive field meetings programme (e.g. Phillips, 2003a,b, 2005). With contributory funding from English Nature, BC also employed a consultant (Barry Fox) to undertake surveys of key sites on the Plain and adjacent areas during 2001 and 2002 (Fox, 2002, 2003). In addition, a grant from the Maitland Emmet BENHS Research Fund enabled survey work to be undertaken in 2003. Several other individuals also assisted with the survey effort.

The results from this survey are very disappointing and would seem to confirm that the species is at a very low ebb and possibly on the verge of extinction in this country. Despite over 50 separate trapping sessions (Appendix 2), with, in most cases, more than one trap being used, only four Brighton Wainscot have been recorded, all from the north of Tilshead site (SU035486). The records are:

- 30 July 2000 – 1 male (S. Swift)
- 27 July 2001 – 1 male (B. Fox)
- 3 August 2001 – 2 males (D. Green/J. McGill)

However, although many sites have been surveyed, there are areas on the Plain that have not been trapped recently and may still have the potential to support this species.

To illustrate the decline of the Brighton Wainscot the distribution map (Fig. 3) gives records from pre-1980 and in the date classes 1980 to 1999 and 2000 to 2003. This breakdown approximately coincides with the collation of records, primarily by Dr P. Waring, for the as yet unpublished *Review of Nationally Scarce and Threatened Macro-moths of Great Britain* which forms the basis for the summary (with a distribution map) in the Action Plan (UK Biodiversity Group, 1999), and the duration of the current project.

European Distribution and Status

Bretherton, Goater & Lorimer (1983) give this species as Eurasiatic. In western Europe, it is widespread from Spain and Portugal to the Paris region, probably migratory in north-western France and south-eastern Belgium and very occasionally recorded in Denmark. Karsholt & Razowski (1996) add that the moth has also been recorded from Poland, the Czech Republic, Slovakia, Germany, Austria, Hungary, Yugoslavia, Romania, Bulgaria, Albania, Malta, Italy and Greece, including Crete, and Turkey. South (1961) includes Syria, North-west Africa and southern Russia.

An initial assessment of the European status of this moth was undertaken by Parsons (2001). Experts in a number of European countries responded to a questionnaire enquiring about the distribution and status of this, and the other UK BAP species, in their countries. The results for this moth were far from encouraging. *Oria muscosa* was confirmed as present from Bulgaria (12 sites, based on an incomplete return); Germany (Baden-Württemberg only) (approx. 10 sites); Portugal (3 sites, based on an incomplete return); Belgium (1 site), with the species being reported from Spain and Italy, but the number of localities being unknown. Further to this, the moth was thought to be declining in Germany, Belgium and Portugal, and its trend in Spain was not known.

Between 14–18 May, 2004, JWP found eight moths on white walls of buildings and shop windows in the town of Paphos, Cyprus; indicating that the species was possibly relatively common in this area of the eastern Mediterranean.

ECOLOGY

Life Cycle

Between 1941 and 1942, H.M. Edelsten succeeded in rearing the moth in captivity from the egg stage (Edelsten, 1944). Cockayne & Kettlewell (1940) give the life history as described by continental authors. The descriptions that follow are based on these papers supplemented by Haggett (1957).

Ovum

The eggs are generally laid in August in rows, usually under one of the lower sheaths of grasses and cereals. In nature these are said to be in two lines of twenty alongside each other (from continental authors, in Cockayne & Kettlewell, *loc. cit.*). They have also been reported to be laid on posts in fields etc. The ovum is described in Edelsten (1944).

Larva

The larva develops within the egg-shell in November and December and can be seen as a dark mass towards one side of the egg (Edelsten, 1944). They begin to hatch around April, and possibly earlier. On hatching the larva enters a grass stem near ground level, first probably eating wild grasses and later moving on to winter wheat, summer rye, oats or barley (in Cockayne & Kettlewell, *loc. cit.*). In captivity the larva has also been noted making its way down the centre of the shoot. The larva feeds internally boring into a stem, making a small round hole near the ground. When the old stem can no longer sustain the growing larva it wanders off to find a new shoot. The root-stock and lower parts of the shoot survive, but the old shoot withers and turns brown above the infected part. Only one larva occurs in each shoot, but

frequently every shoot in a plant is attacked in turn by the same larva (Cockayne & Kettlewell, *loc. cit.*). The larva has also been found in spring-sown oats and barley, though this is probably atypical and dependent on farming conditions.

When nearly full grown the larva leaves the stalk and takes up position beneath the sheathing leaf, which covers the ear of the cereal, and feeds on the unripe grains, filling the whole sheath with white frass (Cockayne & Kettlewell, *loc. cit.*). Based on field observations the whole ear and indeed several ears may be eaten. The presence of a larva may be betrayed by a small entry hole below the ear, though this can be hard to find (Edelsten, *loc. cit.*). A withered ear sheath usually indicates that the larva has left. The larva is described in Edelsten (1944) and described and illustrated in Haggett (1957). We are not aware of any recent searches for the larva.

Pupa

The full grown larva probably leaves the sheath from around the first week of June to mid June and pupates in the earth under an infected stem in a slightly earthen cocoon; when this is pulled out the pupa may be found exposed in the earth beneath. Pupation extends from June to July. The pupa is described in Edelsten (1944).

Imago

Univoltine, the adult moth is generally on the wing from late July to mid August, the peak emergence varying depending on the season.

The moth flies at dusk over cereal fields and later comes readily to light, even on cold nights. It can also be found at night, sitting on the ears of wheat and other cereals (Haggett, 1957). A standard way of finding the moth used to be by following harvesters when the moth was readily disturbed and could be netted (Bretherton, Goater & Lorimer, 1983). We are not aware of this being attempted recently. The adult has been reported to have been found by day, for example on clover heads and on a knapweed flower (in Cockayne & Kettlewell, *loc. cit.*).

Habitat requirements

The species frequents cereal fields, particularly those of wheat, barley or oats over chalk (Fig. 4). Cockayne & Kettlewell (1940) reported that the only unusual feature where the moth was found was the absence of boundary hedges, which were replaced by narrow strips of grassy ground separating one field from another. In 1939, the place where the moth was most numerous was a large field of winter wheat which abutted an enclosure of coarse grass, chiefly Cocksfoot *Dactylis glomerata* L., False Oat-grass *Arrhenatherum elatius* L. and Upright Brome *Bromopsis erecta* (Hudson), approximately 4 hectares in size and which had been allowed to go wild for some years. This enclosure provided breeding cover for game.

There appears to have been some difference in opinion as to the specific requirements of this species. Edelsten (1944) suggested that the eggs could survive being ploughed in with the stubble and those laid higher up could survive the threshing machine. This latter suggestion was supported by the observation of a threshed stack of wheat from a field that supported the Brighton Wainscot the previous year that had stood by the edge of a field of barley. All around this stack was a considerable infestation of barley, hinting that the larvae had wandered out of the straw into the growing crop. Edelsten (*loc. cit.*) also stated that there was "no trace of larvae in any of the grasses on the farm drove, and from the distribution of



Fig. 4. Typical habitat, cereal field Tilshead, June, 2001. Photo: D. G. Green, Butterfly Conservation.

the larvae in the fields it was evident that the eggs were laid on the cereal crops and not on the grasses bordering the fields, as is reported to be the habit in Russia”.

Haggett (1957) suggested that Kettlewell (1945) gave the most likely solution proposing that the main reservoir of the insect would be found outside the cultivated areas and that the larvae feed initially in grasses surrounding the fields from which the moths can invade the cereal crops and breed more successfully in them. However, Cockayne & Kettlewell (1940) suggested that the absence of bare earth for the larva to pupate in would render large areas of wild coarse grasses unsuitable. Kettlewell (*loc. cit.*) considered Edelsten’s findings to be under abnormal conditions, i.e. in 1943 Edelsten found the species during a period of unusual farming practices due to war needs and the necessity for growing the maximum amount of cereals with the normal crop rotation being abandoned, something that Edelsten himself also commented on. It is worth mentioning here that Cockayne & Kettlewell (1940) note that abroad the presence of this moth is looked upon as a sign of untidy farming and that the rotation of crops is recommended. Skinner (1984) concisely summarises the habitat of this species by noting it can be found in fields of wheat and other cereals, and surrounding grass verges.

POSSIBLE REASONS FOR DECLINE

Stubble burning: This may well have been a significant contributory factor to the decline of the species. The species was considered to be declining at Micheldever, Hampshire, because of almost universal stubble burning (Goater, 1992). Jackson (1952) also suggested the practice of burning straw and stubble in dry weather was affecting the species. Since 1993 the practice of stubble burning had ceased although

by then the moth was already very uncommon and had last been recorded from Hampshire ten years prior to this date.

Crop rotation: There is some anecdotal suggestion that crop rotation does influence the population levels of this moth, for example, the usual crop rotation in the Salisbury area was dropped during the war years and led to an abundance of this species. Cockayne & Kettlewell (1940) also suggest that crop rotation is recommended on the continent as a counter measure against the species. Any move away from cereal farming would obviously remove the habitat of this species. However, at least some farmers continue to plant cereals in the Salisbury Plain area on an annual basis.

Winter/spring cereal planting: Kettlewell (1945) notes that searches of winter sown cereal crops were unsuccessful, although Edelsten found larvae in considerable numbers in spring sown cereals. Edelsten (1944) also noted that owing to the mild winter [in 1942/1943] that the main stem of the autumn sown wheat he was using for his rearing experiments was too hard for the larvae to enter and they mostly perished. Consequently it may be that the current apparent bias, although not universal in the area, towards winter as opposed to spring planting could be having an effect upon populations. One farmer on Salisbury Plain suggested that the switch from spring planting to winter planting took place 20 to 30 years ago. Another suggested that winter planting is now the norm in the area. Ploughing takes place almost immediately after harvesting and crop harvesting is also likely to take place earlier in winter sown crops, although at least some crops on the Plain are cut after the flight period of the moth. Fox (2003) noted that the sites trapped during 2002 still had the cereal crops in place at the end of July, but in the Tilshead area these were partially cut by 12 August.

Use of combine harvesters: Jackson (1952) suggested that the increasing use of combine harvesters along with stubble burning "must re-act heavily against the insect".

Modern cereal varieties: It could be that modern cereal varieties, which tend to be shorter, may also be thicker and consequently more difficult for the young larvae to access. However, on farms that also require straw, very short varieties tend not to be used. It has been suggested that when the moth was found around Brighton in the mid nineteenth century that the wheat grew to 5 ft in height (Pratt, 1999).

Insecticides: The modern use of spraying chemicals as a means of pest control could be a major impact on this species, although insecticides are certainly not used on all farms in the Salisbury Plain area. To what extent applications and methods have changed since the 1940s needs to be researched further.

Decline in arable weeds/grasses: *Oria musculosa* is considered to be dependent for its survival upon the existence of grasses along field margins and possibly also within the cereal crop itself. The modern use of herbicides and fertilisers will have severely reduced, if not eliminated, the presence of many arable weeds from the fields. No doubt spray drift has also affected the field margins. Godfrey Smith (pers. comm.), along with his brother, who have both farmed in the Steeple Ashton area of Wiltshire for well over 40 years, suggest this may be a significant contributory factor in this species' decline. Cockayne & Kettlewell (1940) commented on the "thickness of the undergrowth of weeds" in a small area of wheat. It is of interest to note that Fox (2003) reported that at a former site, Winterslow, herbicides and fungicides had been used on the fields during the previous decade, but only once a year. This application had not prevented the growth of many of the arable weeds.

Decline in the quantity of field margins: Although the margins of the fields in the Tilshead area are still bordered by grassy boundaries, these tend only to be one or

two metres deep at most. There are a few areas neighbouring fields where there are more expansive areas of grass, but very little that approaches the 4 hectares or so noted by Cockayne & Kettlewell (1940), which they suggested was a practice frequently adopted in areas away from copses etc. at the time.

Bacterial/viral/fungal infection and parasite load: Little is known of the susceptibility of this species to infection, however Edelsten (1944) notes finding many larvae dead, presumably from bacterial disease. Edelsten (*loc.cit.*) also records that *Meloboris* (*Diadegma*) *crassicornis* (Grav.) (Ichneumonidae: Campoplegini) was bred from a parasitised larva. There is little available evidence to suggest that these are major factors.

Climate change: It may be that the climate for this moth has become unsuitable in this country. There is, however, little evidence to suggest this to be the case.

Development: The disappearance of the Brighton population in the nineteenth century has been attributed to the expansion of Brighton itself (Pratt, 1999).

Relatively few recorders visit the Salisbury Plain area on a regular basis and no static traps are operated in the area. Whilst it is possible that the species has been overlooked, there has, however, been considerable effort during the course of the survey to suggest that the few examples seen is very probably a real reflection of the current status of the species. Although it has not been possible to identify any single reason for this species' decline in central southern England with any certainty there are many potential contributory factors. The most likely factors, however, would seem to involve a combination of changes in farming practices, including stubble burning, changes in crop varieties and land management practices.

CONSERVATION MEASURES

In undertaking an assessment of the European status of this species, Parsons (2001) concluded that the UK had an international responsibility for the conservation of *O. musculosa*. At that time a few moths were being found in the Tilshead area of Salisbury Plain and there was little reason to suggest that the status had changed much since the early 1990s. However, since 2001, no Brighton Wainscot has been seen, despite survey effort and there are now real concerns for the survival of this species in this country. It is possible that the moth still occurs at Tilshead in very low numbers and may well occur on some other part of the Plain, although continued survey effort is needed to ascertain this. Until a colony is located, no real conservation measures can be implemented.

In 2002 the Environmental Support Team of Defence Estates, under the auspices of Dominic Ash and Paul Toynton, had a trial barley field planted, with the aim of encouraging arable weeds, Brighton Wainscot and the Corn Bunting. This was planted near Tilshead and was left to grow. No further management occurred on this site until spring 2004, when half the area was ploughed with, at the time of writing, plans to resow with barley. Whether this field will prove to be suitable for Brighton Wainscot remains to be seen, although there must now be a concern that it may be too little too late.

CONCLUSIONS

The history of the Brighton Wainscot in this country is certainly an interesting one. Why the species disappeared from the Brighton area can only be speculated upon, though the expansion of Brighton does seem to be a possible explanation.

Having said that, there must have been other similar habitats in the general area at the time and bearing in mind its later abundance on Salisbury Plain and the superficial similarity of the two areas its disappearance from around Brighton does seem rather puzzling.

The moth would seem to have been resident on Salisbury Plain some considerable time before the 1930s. However, it expanded its range from Salisbury Plain from the 1930s onwards, spreading into neighbouring Hampshire and subsequently Berkshire, becoming locally common. It is clear that the moth became increasingly frequent during the war years on Salisbury Plain and for a little time after that, the most likely explanation being a change in farming practices. The moth continued to be frequent up until around the mid 1970s when it appeared to go into decline, being subsequently found in numbers only on the Salisbury Plain area. It is clear that the moth wanders, which probably accounts for some records from some counties; others, such as the Devon record, may well be the result of primary immigrants. As to the origin of the populations both in Sussex and on Salisbury Plain one can only speculate. It may be that the Brighton population was the result of a temporary colonisation from the continent, whereas that on Salisbury Plain may have been a longer-term, albeit overlooked, establishment.

There are a number of possible reasons for its current scarcity, but it is likely that a combination of changes in farming practices have had the most impact, from the practice of stubble burning, to changes in cereal varieties, increased tidiness in fields and a decline in the amount and quality of the field margins. This species does also appear to be under threat in at least some parts of Europe.

The Brighton Wainscot is certainly currently at a low ebb at its former stronghold in the Tilshead area and possibly on the verge of extinction in this country. However, as with many other insects, it is well known that species can exist at very low levels which can escape detection only to reappear when conditions become more suitable. Despite increased survey effort over recent years there are areas of the Plain that have not been searched and may well support the moth.

If you have any further information, records, particularly recent records, or observations relating to this species, MSP at Butterfly Conservation would be pleased to hear from you.

ACKNOWLEDGEMENTS

We would like to take this opportunity to thank the Environmental Support Team of Defence Estates, Dominic Ash, Paul Toynton and Hannah Etherington, for assisting with permissions and access to the MoD's Salisbury Plain Training Area (SPTA). We would like to thank Henry Arnold (BRC), John Campbell (Oxfordshire Biological Records Centre), Sean Clancy, Peter Davey, John Dawson, Ian Ferguson, Phil Gould (Rothamsted), Nick Greatorex-Davies, James McGill, Tony Pickles, Colin Plant, Colin Pratt, Sally Scott-White (Wiltshire & Swindon Biological Records Centre), Bernard Skinner, Martin Townsend, John Ward and David Young for assistance with various records, Martin Albertini for details of records and for locating the Ansorge reference, and Tony Davis, Tony Dobson, Barry Fox, David Green, Fiona Haynes, Dan Hoare, Frank Lowe, Godfrey Smith, Paul Waring for their support and assistance with this project. We would also like to thank Dan Hoare for producing the map. The Joint Nature Conservation Committee are thanked for their continuing support of the National Scarce Moth Recording Scheme and English Nature for their continued support of Butterfly Conservation's *The Action for Threatened Moths Project*. Finally we would like to thank the four

farmers, H. Edmunds, J. Grant, D. Kyte and R. Nicholls, who took the time to complete the questionnaire and all those who contributed records or assisted with the fieldwork.

REFERENCES

- Ansorge, E. 1969. *The Macrolepidoptera of Buckinghamshire*. Bucks Archaeological Society, Aylesbury.
- Baker, B.R. 1994. *The butterflies and moths of Berkshire*. Hedera Press, Uffington.
- Bretherton, R.F., Goater, B. & Lorimer, I. 1983. *Noctuidae (continued)*, pp. 36–413. In Heath, J. & Emmet, A.M., *The moths and butterflies of Great Britain and Ireland. Volume 10*. Harley Books, Colchester.
- Brown, D. 1976. Collecting Diary, 1975. *Entomologist's Record and Journal of Variation* **88**: 89–92.
- Chalmers-Hunt, J.M. 1962–1970. *The butterflies and moths of Kent. Part 2. Heterocera (Sphingidae to Plusiidae)*. Published as supplements to the *Entomologist's Record and Journal of Variation*.
- Cockayne, E. A. & Kettlewell, H.B.D. 1940. *Oria (Synia) musculosa*, Hb., indigenous in Britain. *Entomologist's Record and Journal of Variation* **52**: 37–43.
- Collins, G. 1997. *Larger moths of Surrey*. Surrey Wildlife Trust, Pirbright.
- Darlow, H.M. 1951. Observations on migrant Lepidoptera in the Mediterranean. *Entomologist* **84**: 246–253.
- de Worms, C.G.M. 1962. *The Macrolepidoptera of Wiltshire*. Wiltshire Archaeological and Natural History Society, Salisbury.
- Edelsten, H.M. 1944. Contribution to the life history of *Oria musculosa* Hübn. (Lep. Noctuidae). *Entomologist* **77**: 144–148.
- Ellerton, J. 1970. *Oria musculosa* Hubn. and *Hadena compta* Schiff. in north Bucks. *Entomologist's Record and Journal of Variation* **82**: 273.
- Fox, B.W. 2002. *The Brighton Wainscot moth Oria musculosa (Hübner 1808) survey 2001 Salisbury Plain and Bentley Wood*. Butterfly Conservation, Wareham. (Butterfly Conservation Report No. SO2–02).
- Fox, B.W. 2003. *The Brighton Wainscot moth Oria musculosa (Hübner 1808) survey 2002 Salisbury Plain and Bentley Wood*. Butterfly Conservation, Wareham. (Butterfly Conservation Report No. SO3–01).
- Goater, B. 1974. *The butterflies and moths of Hampshire and the Isle of Wight*. E.W. Classey, Faringdon.
- Goater, B. 1992. *The butterflies and moths of Hampshire and the Isle of Wight—additions and corrections*. Joint Nature Conservation Committee, Peterborough. (UK Nature Conservation No. 7).
- Hadley, M. 1984. *A national review of British Macrolepidoptera listing both national and regional rarities*. Nature Conservancy Council, London. (Invertebrate Site Register Report no. 46).
- Haggett, G.M. 1957. Larvae of the British Lepidoptera not figured by Buckler. *Proceedings & Transactions of the South London Entomological & Natural History Society* **1955**: 152–163. Reprinted 1981. *Larvae of the British Lepidoptera not figured by Buckler*. British Entomological & Natural History Society, London.
- Harman, T.W. 1963. Collecting notes for 1962 from Bucks and further afield. *Entomologist's Record and Journal of Variation* **75**: 105–109.
- Harman, T.W. 1967. Season '66. *Entomologist's Record and Journal of Variation* **79**: 129–135.
- Harman, T.W. 1971. The end of a decade. *Entomologist's Record and Journal of Variation* **83**: 171–179.
- Harper, G.W. 1963. Summer 1962 in the New Forest. *Entomologist's Record and Journal of Variation* **75**: 110–114.
- Heslop, I.R.P. 1945. *Oria musculosa* in Somerset. *Entomologist* **78**: 175.
- Hugo, P.D.J. 1974. *Hyles gallii* Rott., *Oria musculosa* Hubn. and *Rhyacia simulans* Hufnagel in Oxfordshire. *Entomologist's Record and Journal of Variation* **86**: 25.

- Jackson, R.A. 1952. Some notes on *Oria musculosa* Hübner in Wiltshire. *Entomologist's Record and Journal of Variation* **64**: 107–109.
- Karsholt, O. & Razowski, J. 1996. *The Lepidoptera of Europe. A distributional checklist*. Apollo Books, Stenstrup.
- Kettlewell, H.B.D. 1945. The life-history of *Oria musculosa* in Britain (Lep. Agrotidae). *Entomologist* **78**: 85–86.
- McCormick, R. 2001. *The moths of Devon*. John Walters, Buckfastleigh.
- Newton, J. & Meredith, G.H.J. 1984. *The Macrolepidoptera of Gloucestershire*. The Cotteswold Naturalists' Field Club, Gloucester.
- Parsons, M.S. 2001. The European status of the UK Biodiversity Action Plan moths. *Entomologist's Record and Journal of Variation* **113**: 49–62.
- Parsons, M., Green, D. & Waring, P. 2000. The Action for Threatened Moths Project. *British Journal of Entomology and Natural History* **13**: 57–63.
- Phillips, J.W. 2000. Butterfly Conservation–Action for Threatened Moths Project. An opportunity for participation by BENHS members. *British Journal of Entomology and Natural History* **13**: 63–66.
- Phillips, J.W. 2003a. Tilshead/Salisbury Plain, Wilts.–5 August 2000. *British Journal of Entomology and Natural History* **16**: 50–51.
- Phillips, J.W. 2003b. Tilshead/Salisbury Plain, Wiltshire, 21 July 2001. *British Journal of Entomology and Natural History* **16**: 59–60.
- Phillips, J.W. 2005. Tilshead, Salisbury Plain, Wilts.–19 July 2003. *British Journal of Entomology and Natural History* **17**: 252–253.
- Phillips, J.W. & Dobson, J.R. 1998. The BENHS Conservation Working Group Priority Species Lists: Macro-moths and Diptera. *British Journal of Entomology and Natural History* **11**: 73–77.
- Pratt, C.R. 1999. *A Revised history of the butterflies and moths of Sussex*. Booth Museum of Natural History, Brighton. (CD Rom only).
- Riley, A.M. 1991. *A natural history of the butterflies and moths of Shropshire*. Swan Hill Press, Shrewsbury.
- Skinner, B. 1984. *Colour identification guide to moths of the British Isles*. Viking, London.
- South, R. 1961. *The moths of the British Isles*. Warne & Co., London. (New Edition).
- Turner, A.H. 1955. *Lepidoptera of Somerset*. Somersetshire Archaeological and Natural History Society, Taunton.
- UK Biodiversity Group. 1995. *Biodiversity: The UK Steering Group Report. Volume 2: Action Plans*. HMSO, London.
- UK Biodiversity Group. 1999. *Tranche 2 Action Plans. Volume IV–invertebrates*. English Nature, Peterborough.
- Waring, P. 1999. *Priority species covered by the National Recording Network for the rarer British macro-moths. The list includes all the Nationally Scarce & Red Data Book macro-moths recorded in the United Kingdom, including the Channel Islands, and some species previously considered Nationally Scarce or potentially likely to become so*. National Moth Conservation Project, News Bulletin 10.
- Waring, P. in prep. *Review of nationally scarce and threatened macro-moths of Great Britain*. Joint Nature Conservation Committee, Peterborough.
- Waring, P., Townsend, M. & Lewington, R. 2003. *Field guide to the moths of Great Britain and Ireland*. British Wildlife Publishing, Hook.

APPENDIX 1. Records of the Brighton Wainscot *Oria musculosa* from 1980 to 1999

Locality/ Year	Vice- county	OS Grid reference	Date	No. of individuals	Recorder	Source
1980						
Fence Wood	22	SU5071	8 August	1	M.R.Britton & N.M.Hall	Baker (1994)
1981						
Lambourn	22	SU3780	?	1	Rothamsted Insect Survey	NSMRS
Longworth	22	SU3899	4 August	?	A.Kennard	Baker (1994)
1982						
Steeple Ashton	8	ST894580	26 July	?	E.G.Smith	NSMRS
1983						
Pepperbox Hill	8	SU215248	?	?	Unknown	National Trust, per NSMRS
Winterslow	8	SU23	?	?	P.Waring	NSMRS
Burghclere	12	SU477618	18 July	1	G.G.Eastwick- Field	NSMRS
1984						
Tilshead	8	SU041465	24 July	3	A.J.Pickles	pers. comm.
West Lavington	8	SU0052	6 August	?	E.G.Smith	NSMRS
1985						
Winterslow	8	SU23	30 August	?	Salisbury & District Nat. Hist. Soc.	NSMRS
1986						
Gore Cross, West Lavington	8	SU0052	8 August	?	J.N.d'Arcy	NSMRS
1987						
Tilshead (West)	8	SU029477	7 August	3	J.W.Phillips	J.W.Phillips
West Lavington	8	SU0051	10 August	?	E.G.Smith	Wiltshire & Swindon Biological Records Centre
1989						
Bentley Woods	8	SU255323	?	1	Rothamsted Insect Survey	NSMRS
Tilshead	8	SU0349	15 July	20	J.Chaineey, J.H.Clarke, R.Cool	NSMRS
Tilshead	8	SU033486	27 July	approx. 12	B.Skinner	pers. comm.

(continued)

APPENDIX 1 (*continued*)

Locality/ Year	Vice- county	OS Grid reference	Date	No. of individuals	Recorder	Source
1990						
Tilshead (West)	8	SU017471	19 July	3	A.J.Pickles	pers. comm.
Tilshead (North)	8	SU036488	25 July	4	A.J.Pickles	pers. comm.
1991						
Tilshead (North)	8	SU034486	4 August	17	J.W.Phillips, D.A.Young	J.W.Phillips
Tilshead	8	SU034487	8 August	4	R.F. McCormick	NSMRS
West Lavington	8	SU0051	12 August	?	J.d'Arcy	Wiltshire & Swindon Biological Records Centre
1992						
Tilshead (North)	8	SU034486	27 July	1	D.A.Young	pers. comm.
1993						
Tilshead	8	SU033486	22 July	1	B.Skinner	pers. comm.
Tilshead	8	SU033486	27 July	3	B.Skinner	pers. comm.
Tilshead	8	SU033486	6 August	2	B.Skinner	pers. comm.
1994						
Horse Down, Tilshead	8	SU023476	5 August	1	G.A.Collins	NSMRS
1998						
Tilshead (North)	8	SU034487	27 July	1	R.F. McCormick	Wiltshire & Swindon Biological Records Centre

NSMRS, National Scarce Moth Recording Scheme.

APPENDIX 2. The Brighton Wainscot *Oria musculosus*: record of sites visited and surveyed between 2000 and 2003 inclusive

Site	OS Grid reference	Date	Recorder	Method	No. of Lepidoptera species recorded	Comments () No. of individuals recorded
2000						
Tilshead (North)	SU035486	30 July	J.W.Phillips, S.Swift	MV light (125 W)	30	Brighton Wainscot (1)
Tilshead (North)	SU035486	5 August	J.W.Phillips	MV light (125 W)	50	BENHS Field Meeting
Tilshead (South)	SU035475	5 August	R.Banks	MV light (125 W)	44	BENHS Field Meeting
Gore Cross, West Lavington	SU001501	5 August	G.Smith, A.Dobson	MV light (125 W)	52	BENHS Field Meeting
Ansty Hill	ST965431	5 August	F.Lowe	Actinic	38	BENHS Field Meeting
2001						
West Bustard Inn	SU084462	16 July	B.Fox	MV light	39	BC
Tilshead (North)	SU019488	19 July	B.Fox	MV light	43	BC
Orcheston	SU054449	21 July	B.Fox	MV light	22	BC
Tilshead (North)	SU035486	21 July	C.Hart	MV light, Actinic	47	BENHS Field Meeting
Gore Cross	SU0051	21 July	G.Smith	MV light	23	BENHS Field Meeting
Ansty Hill	ST965431	21 July	F.Lowe	MV light	44	BENHS Field Meeting
Lavington Down	SU001501	21 July	A.H.Dobson	MV light	23	BENHS Field Meeting
Winterslow, Bentley Wood	SU249308	23 July	B.Fox	MV light	33	BC
Orcheston	SU054449	24 July	B.Fox	MV light	24	BC
Winterslow, Bentley Wood	SU250325	25 July	B.Fox	MV light	60	BC
Tilshead (North)	SU035486	27 July	B.Fox	MV light	47	BC, Brighton Wainscot (1)

(continued)

APPENDIX 2. (*continued*)

Site	OS Grid reference	Date	Recorder	Method	No. of Lepidoptera species recorded	Comments () No. of individuals recorded
2001 (<i>continued</i>)						
Tilshead (North-east)	SU042483	28 July	B.Fox	MV light	68	BC
West Dean, Bentley Wood	SU245281	30 July	B.Fox	MV light	56	BC
Tilshead (North)	SU018491	31 July	B.Fox	MV light	13	BC
Tilshead (North)	SU035486	3 August	D.Green, J.McGill	MV light, Actinic	40	BC, Brighton Wainscot (2)
Tilshead (North)	SU034487	3 August	B.Fox	MV light	22	BC
Greenlands	SU066467	6 August	B.Fox, J.W.Phillips	MV light	42	BC
Boscombe	SU180410	10 August	B.Fox	MV light	39	BC
Tilshead (North)	SU035486	14 August	F.Lowe	MV light	31	BC
2002						
Bentley Wood, Noads Copse	SU258325	15 July	B.Fox	MV light, Actinic	75	BC
Roundway Hill	SU004647	16 July	B.Fox	MV light, Actinic	45	BC
Bentley Wood, Noads Copse	SU256327	17 July	B.Fox	Actinic	?	BC
Bentley Wood, East Dean MoD	SU2826	20 July	B.Fox	MV light	27	BC
Bentley Wood, Noads Copse	SU256327	24 July	B.Fox	Actinic	?	BC
Tilshead (North)	SU035486	26 July	B.Fox	MV light, Actinic	50	BC
Tilshead	SU018475	27 July	J.Porter	MV light	?	
Bentley Wood, Moodys Field	SU253324	28 July	B.Fox	MV light	68	BC
Upavon (West)	SU116543	29 July	B.Fox	MV light, Actinic	19	BC
Bentley Wood, Noads Copse	SU256327	30 July	B.Fox	Actinic	73	BC
Bustard Hotel	SU090462	30 July	F.Lowe	Actinic	23	BC
Bentley Wood, All Saints Church	SU229325	4 August	B.Fox	Actinic	48	BC
Netheravon	SU132485	6 August	B.Fox	MV light, Actinic	54	BC

(*continued*)

APPENDIX 2. (continued)

Site	OS Grid reference	Date	Recorder	Method	No. of Lepidoptera species recorded	() No. of individuals recorded	Comments
2002 (continued)							
Tilshead (North)	SU035486	7 August	B.Fox, M.Parsons	MV light, Actinic	66		BC
Bentley Wood	SU249308	10 August	B.Fox	MV light, Actinic	42		BC
Tilshead (North)	SU035486	11 August	B.Fox, J.W.Phillips	MV light, Actinic	27		BC
Tilshead (North)	SU042483	12 August	B.Fox	MV light, Actinic	42		BC
2003							
Tilshead (West), Horse Down	SU023476	19 July	J.W.Phillips, M.Parsons	MV light	83		BENHS Field Meeting
Field Barn Farm	ST875398	22 July	F.Lowe	Actinic	?		—
Pen Hill Wood	ST878363	22 July	F.Lowe	Actinic	?		—
Lower Pentwood Farm	ST882365	22 July	F.Lowe	MV light	?		—
Tilshead (North)	SU035486	4 August	J.W.Phillips	MV light	25		—
Westbury Down (SPTA)	ST890501	3 August	F.Lowe	Actinic	?		—
Pen Hill Wood	ST878363	6 August	F.Lowe	Actinic	?		—
Summerside Down	ST874378	6 August	F.Lowe	Actinic	?		—
Lower Pentwood Farm	ST882365	6 August	F.Lowe	MV light	?		—
Tilshead, West-down Camp	SU041480	12 August	H.Etherington	MV light	18		—
Tilshead, West-down Camp	SU041480	13 August	H.Etherington	MV light	8		—
Nortons Hide	SU065504	13 August	B.Fox, O.Howells, H.Etherington, D.Ash	MV light, Actinic	22		—

BC, Butterfly Conservation commissioned survey, part-funded by English Nature.

***Cerodontha rohdendorfi* Nowakowski and *Cerodontha staryi* (Starý) (Diptera: Agromyzidae) new to Britain**

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Abstract

The addition to the British species list of two leaf-mining flies of the genus *Cerodontha* subgenus *Butomomyza*, *Cerodontha rohdendorfi* Nowakowski and *Cerodontha staryi* (Starý) found in Scotland and Gloucestershire respectively, is reported.

***Cerodontha rohdendorfi* Nowakowski**

This species was first noticed in Britain by Peter Chandler who collected a male in Argyll in 1974 although its identity was only recognised in 2002. This year eight more specimens came to light while I was identifying Malaise caught material collected along the River Nethy on Speyside in 1999.

Identification: using Spencer (1972) specimens run to subgenus *Dizygomyza* (which then included *Butomomyza*), then to *C. angulata* (Loew) from which it differs externally only in the slightly shorter apical part of M3+4. Using the key to subgenus *Butomomyza* in Spencer (1976) it runs easily to couplet 4(2) where it only just falls within the first part of the couplet, males having a wing length of up to 2.4mm. At this point *C. rohdendorfi* is separated on the length of the apical part of M3+4 relative to the penultimate part. In some specimens the apical part of M3+4 is quite short but in others it is close to three quarters the length of the penultimate part so would run to *C. angulata*.

The genitalia provide the only certain means of identification. The aedeagus is similar to that of *C. angulata*, *C. mellita* Spencer and *C. scutellaris* (von Roser) but in *C. rohdendorfi* the proximal part of the distiphallus is conspicuously longer before the first bend. It also differs in numerous details of the mesophallus and basiphallus (Fig. 1). The epandrium of *C. rohdendorfi* is very distinctive having the ventral corners roundly swollen and rather shiny, the spines of the surstylus being displaced upwards

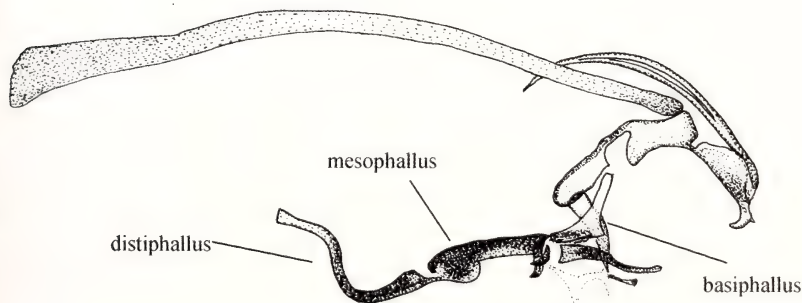


Fig. 1. *Cerodontha rohdendorfi* aedeagus and aedeagal apodeme.

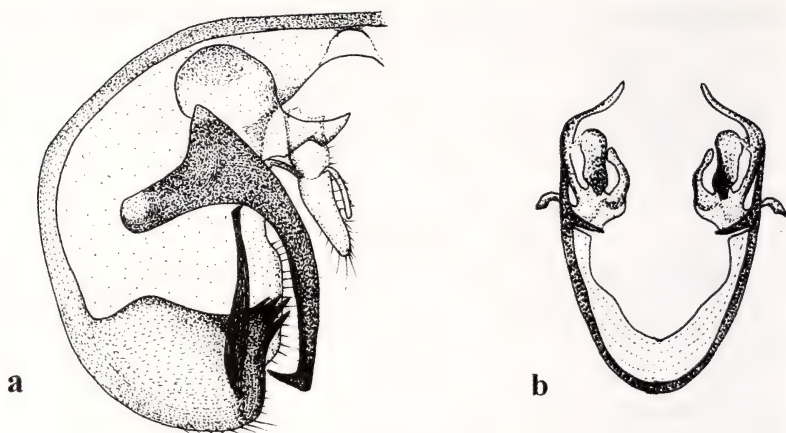


Fig. 2 *Cerodontha rohdendorfi* genitalia, (a) internal view of epandrium, (b) sternite 9.

(Fig. 2a). Dorsally, just above the bases of the cerci, is a low swelling, but this is variable and barely visible in some specimens.

Biology: on the continent this species is known to mine the leaves of *Poa chaixii* Villars, *Festuca pratensis* Hudson and probably related species, unusual in this subgenus as all other *Butomomyza* are associated with *Carex* spp. (Spencer, 1990). They form a mine in the upper or lower surfaces, filling the whole leaf blade. The British specimens examined came from an oakwood and from a river bank in Caledonian pine forest. On the continental mainland it is only known from Finland and Poland (Spencer, 1976).

British specimens examined.

SCOTLAND, Argyllshire, Kenna Craig, 11 July 1974, 1♂ P.J.Chandler.

SCOTLAND, Grampian, Abernethy Forest RSPB Reserve, River Nethy, 19 June to 5 July 1999 5♂ RSPB.

SCOTLAND, Grampian, Abernethy Forest RSPB Reserve, River Nethy, 5 to 19 July 1999 3♂ RSPB.

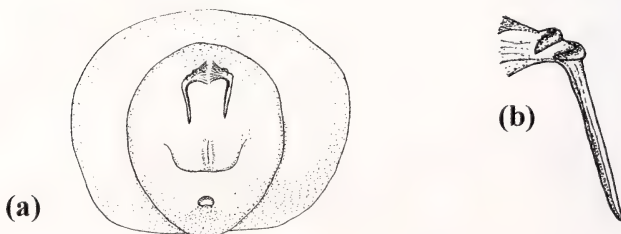


Fig. 3. *Cerodontha staryi* puparium, (a) rear view, (b) posterior spiracular process.

Cerodontha staryi (Starý)

During a Gloucestershire Invertebrate Group field meeting at Strawberry Banks Nature Reserve in April 2003 I found three mines in the leaves of a *Carex* plant. All the larvae had pupated in the mines so in order to preserve the leaves with the mines I removed the three puparia and placed them in a 30ml glass tube in the hope of rearing them. On examination of the puparia it transpired that there were two species present, a single *Cerodontha caricicola* (Hering) and two with remarkably elongated rear spiracular processes. Both Hering (1957) and Nowakowski (1973) illustrated the puparia of numerous species and the only one exhibiting this modified spiracular process is *Cerodontha staryi*. As far as can be discovered this elongation of the rear spiracular processes is unique to *C. staryi* (M. von Tschirnhaus *pers comm.*), certainly no other *Carex* feeding species are known to possess such a character.

Unfortunately neither of the puparia produced adult flies, one seemed to become mouldy and the other was parasitised by a chalcid. Searches for further puparia in spring 2004 were not successful.

Identification: the long processes of the puparium are diagnostic (Fig. 3). For identification of adults see Nowakowski (1973). No adults have been examined but in Spencer (1976) *C. staryi* should run to couplet 3 where it is most similar to *C. scutellaris* from which it is separable by examination of the genitalia.

Biology: host *Carex*, Nowakowski (1973) give *Carex sylvatica* Hudson, *Carex pallescens* L. and *Carex remota* L., all species which are associated with woodland. The Gloucestershire specimens were in *Carex sylvatica* growing along a track in beech woodland on the Cotswold limestone. *Cerodontha staryi* is a rare species with only a few records, all from Central Europe (M. von Tschirnhaus *pers comm.*).

British specimens examined.

ENGLAND, Gloucestershire, Strawberry Banks nature reserve, 12 April 2003 two puparia.

Acknowledgements

The author is very grateful to Peter Chandler for the loan of his specimen of *C. rohdendorfi* and to Dr Michael von Tschirnhaus for his comments on *C. staryi*. I would also like to thank the Royal Society for the Protection of Birds for providing the Malaise samples and the Gloucestershire Wildlife Trust for access to their Strawberry Banks nature reserve.

References

- Hering, E.M. 1957. *Bestimmungstabellen der Blattminen von Europa*. Vol. 1 & 3. Dr W. Junk, s-Gravenhage.
- Nowakowski, J.T. 1973. Monographie der europäischen Arten der Gattung *Cerodontha* Rond. (Diptera, Agromyzidae). *Annales zoologici, Warszawa*. 31: 1–327.
- Spencer, K.A. 1972. Diptera, Agromyzidae. *Handbooks for the Identification of British Insects*. Vol. X, part 5(g), Royal Entomological Society.
- Spencer, K.A. 1976. The Agromyzidae (Diptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica* 5 part 1, 304pp.
- Spencer, K.A. 1990. Host specialization in the world Agromyzidae (Diptera). *Series Entomologica* 45, 1–444. Kluwer Academic Publishers.

SHORT COMMUNICATION

Additional records from the Rothamsted Light Trap Survey of Horse Chestnut Moth *Pachynemias hippocastanaria* (Hb.) (Lepidoptera: Geometridae) in Southern England.—Since producing the recent note (Pickess, 2005) about the seasonal occurrence of *Pachynemias hippocastanaria* (Hb.) (Horse Chestnut) at Arne, Dorset, Ian Woiwod has kindly provided me with details from other light traps in the Rothamsted Insect Survey Network (Woiwod & Harrington, 1994), that are also in proximity to heathland in southern England and have recorded *P. hippocastanaria*. Of particular interest is the long series of data from three sites (No. 78 Linford, nr. Ringwood (Hampshire) (8 years, 1968–1975), No. 266 Yarner Wood I (Devon) (26 years, 1974–2000) and No. 368 Denny Lodge nr. Brockenhurst (Hampshire) (25 years, 1978–2003)) (Table 1). Although catches at these three sites are much smaller than those at Arne, they mirror those observations. A point of interest is that at Yarner Wood, like Arne, the second brood was frequently recorded well into mid-September in most years. These additional data would support my proposition that on southern heaths the species may be found in small numbers during the late autumn and winter. These long data series from 1974 to almost the present time also show that the pattern of emergence has changed little over the past 30 years.

Table 1. Total catches of *Pachynemias hippocastanaria* (Horse Chestnut) from each of three long running Rothamsted Traps located in Hampshire and Devon during 1968–2003

Month	No. 78 Linford	No. 266 Yarner Wood I	No. 368 Denny Lodge	Total No. recorded
January	—	1	—	1
February	—	3	4	7
March	3	10	25	38
April	6	3	14	23
May	12	8	6	26
June	9	13	1	23
July	36	230	31	297
August	74	611	55	740
September	4	118	4	126
October	4	10	3	17
November	—	1	2	3
December	2	—	1	3

REFERENCES

- Pickess, B. P. (2005). Adults of the Horse Chestnut *Pachynemias hippocastanaria* (Hb.) (Lepidoptera: Geometridae) occur throughout the year on the Purbeck heaths, Dorset. *British Journal of Entomology and Natural History* 18:
- Woiwod, I. P. & Harrington, R. (1994). Flying in the face of change: The Rothamsted Insect Survey, pp. 321–342 in Leigh, R. A. & Johnston, A. E. (Ed.) *Long-term Experiments in Agricultural and Ecological Sciences*. CAB International. Wallingford.

BRYAN P. PICKESS,

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OFFICERS' REPORTS FOR 2004

COUNCIL'S REPORT 2004

As has been the custom in recent years the Council met seven times in the course of the year with, on average, 14 Council members attending each meeting. We are grateful to the staff of the Royal Entomological Society who stay late in the evening so that we can use the RES Council Room for these meetings.

This year the Council approved 52 applications for membership and the reinstatement of one former member. Against this, 17 members resigned and 22 were struck-off for non-payment of their subscription. Alas the deaths of 11 members were reported to the Society during the year. These included two of our Honorary members and one Special Life Member. The net result of these changes is that at the end of the year the total membership stood at 901, an increase of three on the previous year. Two members, Mr B. McC. Gerard and Dr A.J. Showler completed 50 years' continuous membership at the end of the year and the Council was delighted to elect them to Special Life Membership.

Although the Society's membership continues to increase we cannot afford to be complacent. A small annual increase in membership could easily become a decrease, especially as we suspect that the average age of our members is increasing. With this in mind, and at the President's suggestion, the Council has discussed circulating a questionnaire to the members asking them what they like about the Society and what kind of changes and activities they would like to see in the future. We hope that the contents of the questionnaire will be finalised early in 2005 and sent to members later in the year.

Conservation matters continue to play a large part in the Council's deliberations and the Society is represented on Invertebrate Link by Raymond Uffen and John Phillips; John Phillips also serves on the executive committee of Invertebrate Link. Some time was spent considering and drafting a reply to the anticipated DEFRA consultation document on the Fourth Quinquennial Review of Schedules 5 and 8 of the Wildlife and Countryside Act 1981. Bernard Skinner's help was sought in drafting the reply and he attended a Council meeting to help us understand the situation regarding the proposal to give two subspecies of Burnet moths, *Zygaena lonicerae* ssp. *jocelynae* and *Zygaena loti* ssp. *scotica*, full protection under Schedule 5 of the Act. The Council is of the opinion that no evidence has been offered which justifies giving these species full protection under the Act. Stephen Miles and John Muggleton gave a poster presentation describing the Society's Heathland Fly project at a two day English Nature meeting in Sheffield to promote Biodiversity Action Plans. Further funding has been received from English Nature which enabled the project to continue in 2004. As a result of information gained from the project, Stephen Miles has produced a code of practice for the management of heathland paths to the benefit of the many insects for whom sandy paths are an important habitat.

The Society made a written submission to the Inquiry into Scientific Publications by the House of Commons Select Committee on Science and Technology. The submission concentrated on the need to make provision for amateur and unwaged entomologists to have full access to electronically published scientific periodicals. It also highlighted the increasing tendency of scientific societies in the English speaking world to use commercial publishing houses to produce their journals. This tendency

has led to these journals being sold at a price beyond that affordable by individual subscribers and indeed by the libraries of the very institutions whose staff provide their services free to the journals.

The poor attendance at the Society's weekday evening meetings in South Kensington was discussed in last year's report. It was felt that it was difficult to justify holding these meetings on a monthly basis, and the meetings programme for 2004/05 was drawn up with meetings reduced to one every two months. In the last twelve years we have gone from two meetings a month to one meeting every two months. However, no complaints have been received from members as a result of this change. As a new venture this year, two all day meetings were held at Dinton Pastures. One was for lepidopterists on the proposed macromoth recording scheme and the other a general meeting for coleopterists. Four workshop meetings were held in the Pelham-Clinton Building and covered the identification of groups of Hymenoptera, Diptera and Coleoptera. BWARS used the P-C Building for a workshop associated with their AGM and the British Myriapod and Isopod Group held a committee meeting in the P-C Building. The Society's collection and library were open to members on 15 scheduled occasions during the year and, by special arrangement, to individual members on a number of other occasions. The Council thanks Dr Ian McLean for arranging the meetings, Peter Chandler for attending to open the P-C Building for the scheduled meetings and David Wedd for opening the building at the special request of members.

The Council must also congratulate Dr Paul Waring for, once again, organising a varied field meetings programme with 39 meetings being held from May to October. In contrast to the indoor meetings the number of field meetings has more than doubled in the last twelve years and this is in no small way due to the enthusiasm of our Field Meetings Secretary and the willingness of the meeting leaders. It is also good to be able to report an increase in the number of members signing the attendance book at the Annual Exhibition to 184 compared with 165 in 2003; 51 visitors also signed the book. The number of exhibits was also higher than in 2003, while the number of diners at the Annual Dinner fell slightly. Mike Simmons' apparent effortless organisation of both the Exhibition and the Dinner belies his key role in this most important event in the Society's calendar. A possible alternative venue for the Exhibition and Dinner has been identified for 2006 and the Council will be discussing the pros and cons of this venue in the coming year.

Disappointingly there have been no new publications this year, although all our authors have reported progress with their projects. We must remember, however, that all our authors are busy people writing these books in their spare time and without payment, and we are sure that our patience will be rewarded. Our current publications continue to sell, with receipts for the year of £5967 for books and £967.25 for subscriptions to the *Journal* and back numbers. These sales would not be possible without the effort put in by Gavin Boyd in dealing with orders by post and manning the Society's stand at exhibitions. One unexpected pleasure this year was an offer by Julie Tennent, the wife of one of our members, to produce a new Christmas Card for the Society. The offer was accepted, Julie provided the artwork and, with her husband John, made all the arrangements for the card to be printed. The card, which showed a pair of Holly Blue butterflies, had sold out before the close of the Annual Exhibition and had to be reprinted to satisfy further orders, a first for the Society. Julie Tennent has volunteered to produce another design for 2005.

As well as those named above, many others have contributed to the continued well being of the Society in 2004. These include the lecturers, workshop and field meeting leaders, David Young for ensuring that the Society's journals and notices are

distributed on time, Andrew Godfrey for welcoming and informing new members, Roger Hawkins for relentlessly pursuing subscriptions and Andrew Halstead for his multi-tasking skills which include taking the minutes at indoor meetings, managing the photographic slide collection and keeping the shrubbery at the side of the Pelham-Clinton Building under control. The Council is happy to thank all these people for their contributions to the Society.

JOHN MUGGLETON

TREASURER'S REPORT

FINANCIAL YEAR TO 31 DECEMBER 2004

Financially 2004 has been a very similar year for the Society to 2003. Again we have had no new publication and as a result sales activity and the resulting income to the Special Publications Fund has been reduced. It is expected that 2005 will see new publication and a revival in this aspect of the accounts.

The stock exchange has remained modestly buoyant and further unrealised gains on investments have been made. Last year I said that we had agreed to reinvest one part of our portfolio. However, the consideration that we may have had an opportunity to extend our premises at Dinton Pastures, in which case we would have needed to sell some investments, caused a decision to keep the investment as it was rather than risk incurring double charges. We have adequate liquid funds to finance our normal activities for 2005 without selling investments.

Our income is up by some £2,000, largely as a result of the generosity of past and present members with the sale of surplus cabinets from the Maitland Emmet collection, a donation of £800 towards the cost of colour plates in the journal from Graham Howarth and £200 from the estate of John Bradley. These additional amounts more than compensated for the drop in sales income. Direct charitable expenditure has increased also by some £2,000; principally an increase of £2,800 in journal costs and a reduction of £700 in grants paid out. Overall the diminution in value is reduced to £2,273 this year. Although this level of annual deficit can be sustained for some time I feel the time to increase our very modest subscription rate is approaching in order to compensate for the increasing cost of the journal and our full programme of services offered to members.

This year, in addition to the sterling work of Roger Hawkins as Assistant Treasurer dealing with all aspects of membership subscriptions, I have enjoyed the help of John Flynn dealing with routine matters. My job has been made very much easier by these gentlemen to whom I extend my thanks. Once again A. S. Harmer has undertaken the independent examination of the financial records together with H. G. M. Middleton. I thank both of our auditors for their contribution.

A. J. PICKLES

Trustees' Report

The principal activities of the Society are to hold meetings at the Society's Rooms for the reading of original papers, discussions and lectures, to hold an annual exhibition and field meetings; to issue publications and to form typical collections and a library. These activities are carried on with the object of promoting and advancing research in Biological Science and its diffusion.

The Society has enjoyed another successful year with a varied programme of Field Meetings, Indoor Meetings and Workshops. Further grants for entomological research have been made from the Maitland Emmet BENHS Research Fund and from the Hering Fund.

A detailed risk assessment has been ongoing during the year.

Signed on behalf of the Trustees

J. MUGGLETON, Secretary

Independent Examiners' Report

We report on the accounts of the Society for the year ended 31 December 2004, which are set out on the following pages.

Respective Responsibilities of Trustees and Examiners

As the Charity's Trustees you are responsible for the preparation of the accounts, you consider that the audit requirement of Section 43 (2) of the Charities Act 1993 does not apply. It is our responsibility to state, on the basis of procedures specified in the General Directions given by the Charity Commissioners under Section 43(7)(b) of the Act, whether particular matters have come to our attention.

Basis of Independent Examiners' Report

Our examination was carried out in accordance with the General Directions given by the Charity Commissioners. An examination includes a review of the accounting records kept by the Charity and a comparison of the accounts presented with those records. It also includes consideration of any unusual items or disclosures in the accounts, and seeking explanations from you as Trustees concerning any such matters. The procedures undertaken do not provide all the evidence that would be required in an audit, and consequently we do not express an audit opinion on the view given by the accounts.

Independent Examiners' Statement

In connection with our examination, no matter has come to our attention:

1. which gives us reasonable cause to believe that in any material respects the requirements
 - a. to keep accounting records in accordance with Section 41 of the Act; and
 - b. to prepare accounts which accord with the accounting records and comply with the accounting requirements of the Act. have not been met; or
2. or to which, in our opinion, attention should be drawn in order to enable a proper understanding of the accounts to be reached.

A. S. HARMER and H. G. M. MIDDLETON

Dated 3 March 2005

*Statement of Financial Activities
for the year ended 31 December 2004*

	Unrestricted Funds	Restricted Funds	Endowment Funds	Total Funds 31.12.04	Total Funds 31.12.03
<i>Incoming Resources</i>					
Bequests and donations	1000	—	—	1000	351
Subscriptions	13237	—	—	13237	12133
Investment Income	5744	4042	851	10637	10613
Trading Income note 2	2467	8106	—	10573	12346
Sundry Income note 3	3151	—	—	3151	1302
<i>Total Incoming Resources</i>	25599	12148	851	38598	36745
<i>Resources Expended</i>					
<i>Direct Charitable Expenditure:</i>					
Cost of Journal & Distribution	15806	—	—	15806	12958
Cost of facility at Dinton Pastures	—	4592	—	4592	3768
Members Meetings & Services	6902	—	—	6902	7523
Library & Curation	1616	—	—	1616	2394
Grants notes 10,11	2000	—	750	2750	3404
Depreciation	3736	2210	—	5946	5946
	30060	6802	750	37612	35993
<i>Other Expenditure</i>					
Management costs	2780	—	—	2780	2416
Trading costs note 2	254	5192	—	5446	9980
	3034	5192	—	8226	12396
<i>Total Resources Expended</i>	33094	11994	750	45838	48389
<i>Net Resources before transfers</i>	(7495)	154	101	(7240)	(11644)
<i>Net Incoming /Outgoing Resources</i>	(7495)	154	101	(7240)	(11644)
<i>Gains & Losses on Investment assets</i>					
Realised	—	—	—	—	—
Unrealised	2683	1887	397	4967	6470
<i>Net movement in Funds</i>	(4812)	2041	498	(2273)	(5174)
<i>Fund Balances brought forward at 1 January 2004</i>	102080	280694	15901	398675	403849
<i>Fund Balances carried forward at 31 December 2004</i>	97268	282735	16399	396402	398675

Summary Income and Expenditure Account

	2004	2003
Gross Income of continuing operations	38598	36745
Total expenditure of continuing operations	<u>45838</u>	<u>48389</u>
<i>Net Income(Outgoings) for the year</i>	<u>(7240)</u>	<u>(11644)</u>

Balance Sheet as at 31 December 2004

	Notes	2004	2003	2003
<i>Fixed Assets</i>				
Tangible Assets	4	158104		164050
Investments	5	<u>207828</u>		<u>202861</u>
		365932		366911
<i>Current Assets</i>				
Stocks		14127	17009	
Debtors	6	9717	10468	
Cash at Bank and in hand	7	<u>15688</u>	<u>13197</u>	
		39532	40674	
<i>Creditors: amounts falling due within one year</i>	8	<u>9062</u>	<u>8910</u>	
<i>Net current assets</i>		30470		31764
<i>Net assets</i>		<u>396402</u>		<u>398675</u>
<i>Funds</i>	9			
Endowment Funds—Hering Fund		16399		15901
Restricted Funds—Housing Fund		207597	208470	
Special Publications Fund		<u>75138</u>	<u>72224</u>	280694
Unrestricted Funds:				
Maitland Emmet BENHS Research Fund		51438	50786	
General Fund		<u>45830</u>	<u>51294</u>	102080
		396402		398675

The accounts were approved by the Trustees on 3 March 2005 and signed on their behalf.

Notes to the accounts for the year ended 31 December 2004**1. Accounting Policies**

The Accounts of the Charity are prepared in accordance with the Charities (Accounts and Reports) Regulations 1995, the statement of recommended practice, Accounting by Charities, and with applicable accounting standards. They are drawn up on the historical accounting basis except that investments held as fixed assets are carried at market value.

1.1 Income

Donations and legacies are accounted for as soon as their amount and receipt are certain. In the case of donations this is usually when they are received. All other income is accounted for under the accruals concept. Gifts in kind are valued at their estimated value to the Charity.

1.2 Expenditure

Expenditure is accounted for under the accruals concept. The irrecoverable element of VAT is included with the item of expense to which it relates. Depreciation is allocated over the expenditure headings on the basis of the use of the assets concerned.

1.3 Tangible Fixed Assets

Tangible fixed assets are stated at cost or trustees valuation less depreciation which is calculated at rates to write off the excess of cost over estimated residual values of individual assets over their estimated useful lives as follows:

Leasehold Buildings at Dinton Pastures	1/70th of cost
Fixtures and Equipment	10% of written down value

1.4 Investments

Fixed asset investments are stated in the balance sheet at mid market value at the balance sheet date.

1.5 Stock

Stock is valued at the lower of cost, including irrecoverable VAT, and market value and consists of publications and sundries held for resale.

1.6 Restricted Funds

Restricted funds are subject to specific conditions laid down by the donors as to how they may be used.

2. Trading Income and Expenditure

Trading income is derived from the sale of the *British Journal of Entomology* to non-members of the Society and from sale of the Society's other publications and products, costs are those of producing and distributing these items.

3. Sundry Income

Sundry income has been derived from the sale of surplus books, cabinets and specimens, photocopying and income from the annual dinner.

4. Tangible fixed assets

Cost	Leasehold Property £	Fixtures & Equipment £	Total £
At 1 January 2004	154736	69399	224135
Additions	—	—	—
Disposals	—	—	—
At 31 December 2004	<u>154736</u>	<u>69399</u>	<u>224135</u>
<i>Depreciation</i>			
At 1 January 2004	24310	35775	60085
Charge for year	2210	3736	5946
On disposals	—	—	—
At 31 December 2004	<u>26520</u>	<u>39511</u>	<u>66031</u>
<i>Net book values</i>			
At 31 December 2004	<u>128216</u>	<u>29888</u>	<u>158104</u>
At 31 December 2003	<u>130426</u>	<u>33624</u>	<u>164050</u>

Leasehold premises represent the cost of building and equipping the headquarters at Dinton Pastures Country Park. The total cost of these premises, which were completed during the year to 31 December 1993, are being amortised over the seventy year term of the lease. Fixtures and equipment includes a value for the library and collections as well as computers, microscopes and other ancillary equipment.

5. Investments

In accordance with accounting requirements investments are shown in the balance sheet at market value.

	2004		2003	
	MV	Cost	MV	Cost
Shell T & T	5831	1250	5501	1250
Unilever	10030	248	9598	248
M & G Charifund	63749	20238	61893	20238
Hendersons Bond	56184	58000	54684	58000
AXA Sun Life Bond	47942	56000	47234	56000
Barings Bond	24092	25000	23951	25000
	<u>207828</u>	<u>160736</u>	<u>202861</u>	<u>160736</u>

Unrealised gains arising in the year are shown in the Statement of Financial Activities.

6. Debtors

	2004	2003
Due within one year		
Trade debtors	1674	946
Recoverable Taxation	4528	4528
Prepayments and accrued income	<u>3515</u>	<u>4994</u>
	<u>9717</u>	<u>10468</u>

7. Cash at Bank and in Hand

In interest bearing accounts at National Westminster Bank	<u>15688</u>	<u>13197</u>
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8. Creditors: amounts falling due within one year

Trade Creditors	2342	2103
Accruals	<u>6720</u>	<u>6807</u>
	<u>9062</u>	<u>8910</u>

9. Funds

Analysis of net assets between funds

	Tangible Fixed Assets	Investments	Net Current Assets	Total
Endowment Funds:				
Hering Fund	—	16399	—	16399
Restricted Funds:				
Housing Fund	128216	79381	—	207597
Special Publications	—	54410	20728	75138
Unrestricted Funds:				
Maitland Emmet				
BENHS Research Fund	—	33822	17616	51438
General Fund	<u>29888</u>	<u>23816</u>	<u>(7874)</u>	<u>45830</u>
	<u>158104</u>	<u>207828</u>	<u>30470</u>	<u>396402</u>

The Hering Fund was endowed to make grants out of income for research in specific areas of entomology.

The Housing Fund consists of the property at Dinton Pastures and money put aside to finance its upkeep and eventual replacement. The funds were derived principally from bequests from the late Duke of Newcastle, Mr Crow and Mr Hammond.

The Special Publications Fund finances the Society's publications other than the *British Journal of Entomology* and surpluses from such publications are credited to this fund to finance future publications. Investment income is not accrued to this fund.

10. Bequests & Donations

The Maitland Emmet BENHS Research Fund was established in 1996 with the intention of financing future grants for entomological research which would be less narrowly defined than those made by the Hering Fund.

11. Grants

Grants of £750 were paid from the Hering Fund and of £1000 from the Maitland Emmet BENHS Research Fund. An additional grant of £1000 was paid towards the publication costs of *The Moths of Essex*.

REPORT OF THE MAITLAND EMMET BENHS RESEARCH FUND

Three applications for grants were received this year and each was successful, although the full amount requested was reduced in some cases where the panel felt that parts of the work were not appropriate for support by the Fund. The three awards, totalling £1000, were made as follows:

1. Mr Robert Coleman, £300, to support an investigation into the ecology of the Scarlet malachite Beetle, *Malachius aeneus* (L.), an RDB2 species known from just eight localities and declining in numbers.
2. Mrs Jane Smith, £500, to allow Dr Frank Menzel from Germany to visit the UK as part of a collaboration with Mrs Smith to produce a revision of the *Handbook for the Identification of British Sciariid Flies*. This is the second award from the Fund to this project.
3. Dr Paul Waring, £200, towards an investigation into the larval ecology of the Scarce Hook-tip Moth, *Sabra harpagula* (Esp.), to provide information to assist the conservation management of the habitat of this species.

I would like to thank the members of the panel and the external referees we consult, when we need additional expertise, for their time and careful consideration of the applications.

Reports were received from Dr M.E. Archer and Mrs J. Mackay who received grants in 2002 and from Dr R.G. Field, Mrs J.E. Smith and Dmitry Telnov who received grants in 2003.

During the year the Council decided that following the affiliation of the British Myriapod and Isopod Group (BMIG) to the Society grants from the Research Fund should be available for research on myriapods and isopods. It was agreed, therefore, that the groups covered by the Fund should be widened to "non-marine arthropods, with preference given to insects, arachnids, myriapods and isopods". We now await a myriad of applications from BMIG.

Applications for future awards from the Fund in the fields of taxonomy, field biology and conservation of non-marine arthropods and related to the fauna of the British Isles should be sent to the Society's Honorary Secretary (from whom further details can be obtained) before 30 September in any year.

JOHN MUGGLETON

PROFESSOR HERING MEMORIAL RESEARCH FUND

The Committee considered four applications to the Fund for 2005. Two of these were supported and one was withdrawn. Jenny Craven from the Department of Biology, University of Leeds, was granted £500 to enable her to collect specimens from two species of leaf-mining Coleoptera, *Psylliodes* (Chrysomelidae) and *Ceutorhynchus* (Curculionidae), from sites on the Scandinavian coast. This work forms part of a broader PhD study on the ecology and evolution of endemic beetles associated with the Lundy cabbage (*Coincya wrightii*) and their relatives.

Dr Henry Disney, Department of Zoology, University of Cambridge, was awarded the sum of £250 to support his work on scuttle flies (Phoridae). The grant will help towards travel and consumables needed to continue or complete various projects on the revisionary taxonomy of this family of Diptera.

I have received a report from Dr Vladimir Zlobin, who received a grant for 2004 to support his fieldwork on Agromyzidae in the Russian Far East. The expedition, to the central part of Primorsk Territory, took place between 1 July and 10 August. Dr Zlobin collected about 2000 agromyzid specimens belonging to 15 genera. Preliminary investigations suggest that there are probably six new species among this material. The information obtained will be used for the preparation of an identification key to Agromyzidae of the area and for further revisionary work. A number of specimens were reared from the mining stage. Observations on agricultural crops revealed the presence of at least 2 quarantine pests in the Russian Far East, which have been introduced from neighbouring territories during the last five or six years. Many Palaearctic species were recorded from the region for the first time.

I am very grateful to the other members of the Hering Committee for the work they have done in assessing applications to the Fund.

MALCOLM J. SCOBLE

LIBRARIAN'S REPORT

The year 2004 has seen advances in the computerised cataloguing of our library database. Around 150 newly purchased, donated or bequeathed titles have been catalogued and placed on the shelves. However, there are many more items yet to be processed, and to this end I am very grateful to Gavin Boyd for offering his assistance with this project. Before much more progress can be made with this, there will have to be a radical reorganisation of the shelf space occupied by various subjects. Space is running out particularly on the Lepidoptera, local list, Hymenoptera and Diptera shelves, to mention but a few.

The treatment of old leather bound journal bindings continues, though at a slower pace this year than previously. The benefits of this restoration procedure are obvious when one compares treated items with untreated ones. I am pleased to report that the end of this project is now in sight, although the next stage is to address the leather bound books.

This year I am sorry to report, once again, that the Library has benefited following the loss of one of our more senior and highly respected members. It was with great regret that I visited the house of Ted Wiltshire at Cookham during August to help Martin Albertini select titles from Ted's library that his family had said the Society could remove. I am very grateful to them for their generosity and to Martin for boxing and transporting the books, journals and other items to Dinton Pastures at relatively short notice.

Another acquisition of a more agreeable kind took place towards the latter half of the year with the incorporation of the British Myriapod and Isopod Group's library with our own. The items concerned are held on the relevant shelf, are identifiable as belonging to BMIG and can be accessed by all members.

In my report last year I drew attention to a proposal that had been put to Council concerning the prohibition of journal loans from the library. The opinion of library users on this was canvassed, with the outcome that a small majority were in favour of halting the current practice of allowing journals to be taken out on loan by members (13 for prohibition, 11 against). I have analysed the number of library loans from 1989 up to and including 2004. The analysis showed that the trend, identified in my Report for 1998, for loans to be predominantly of books rather than journals has continued. Annual journal loans, as a percentage of total annual loans, have fallen from 48% in 1989 to just 16% in 2003, and remained at this level in 2004. Therefore, on the basis of usage and of the opinions expressed by library users, I wish to take this opportunity to announce a change in our policy regarding journal loans. This change, subject to ratification by the Society's Council, will take effect in 2005. From then members will no longer be permitted to borrow journals. However, if members have specific research needs which involve the intensive use of journals, they can contact me regarding their needs and I will endeavour to arrange a limited loan period with them. This arrangement will be for a trial period. It will be reviewed if there is no demand for it or if the practice proves disruptive for other library users.

During the year some of the late Baron de Worms' diaries were returned to the Library by a member who had had them on long-term loan. It did not seem appropriate for these diaries to be held by the Society when the collections they related to were housed in the National Museum of Scotland in Edinburgh. Mark Shaw of the National Museum confirmed that reuniting the diaries with the collections would be useful and be welcomed by the Museum. Accordingly the Council agreed that the diaries should be given to the National Museum of Scotland, and their transfer will be arranged in 2005. The Society also has a small collection of Baron de Worms' correspondence and moth records for the London area. Whether the Society should retain these is being discussed.

I would like to end this year's report, my tenth as Librarian, by thanking Dr John Muggleton for his assistance with collating and recording new journal arrivals. I also wish to thank John Harold, David Young, Robin Williams, David Cork and Dr A. E. Whittington for donating books and off-prints to the Library during the past year.

IAN SIMS

CURATOR'S REPORT

I can report that a net reduction in our holdings of cabinets and specimens has taken place during 2004 so that there is a little more space for members to make use of the facilities, and fewer central obstructions; this has been appreciated by our regular users.

As reported last year we set out to dispose of approximately 10,000 surplus specimens of macrolepidoptera and the duplicates weekend advertised in the programme took place as planned in April. The recording of data before dispersal had been considered a priority and this was achieved for significant specimens among the general duplicates. I thank David Wedd for this, while Tony Davis is to be congratulated for documenting all macro specimens in the Emmet collection as a permanent record, available to members, now that the collection has been dispersed.

The duplicates weekend was attended by 26 people, with the Saturday especially busy, thanks to some unexpected arrivals, but generally went well. A list of the more desirable specimens had been prepared by David and Tony and circulated beforehand to those known to be coming, with the option that these could be reserved. This proved successful as, where there was an overlap in requirements, there were usually sufficient specimens to satisfy most requests. Not surprisingly, a residue of a few thousand specimens remained at the end of the weekend and sufficient space had been freed in the duplicates cabinet to transfer these, so that the three surplus cabinets could be cleared ready for sale.

These cabinets were advertised to all members. Previous sales have been largely restricted to those members who have enquired about availability or are aware of this through attendance at Society events. Interest in this sale was, however, disappointing in that only four bids were received for the cabinet in the best condition and none for the other two cabinets, which required some repair. It was consequently necessary to sell the two latter to a member who had made an offer for them, with repair in mind, prior to the general advertisement. Nevertheless, if any other cabinets become available for sale in the future we have decided to continue offering them to all members in this way.

Last year I thanked John Robbins of Porlock, Somerset for work he had done on Eric Bradford's leaf mine collection during 2003. This collection has now been returned to the Society by Brian Gale, unfortunately subsequent to John's death. The mines have been identified as far as practicable although some further curation will be necessary in cases where there are several mines in the same envelope which have not been identified individually, only a list of contents being provided.

I also mentioned last year that duplicate material of Coleoptera was still being processed. This mainly comprised unnamed specimens given to us by Charles Mackechnie Jarvis. Richard Wright and Steve Lane completed work on the bulk of this during 2004. They identified all specimens apart from aleocharine staphylinids and returned the material arranged by family in 22 store boxes. By previous agreement with them, examples of about 135 species were retained for the collection of the Herbert Art Gallery and Museum in Coventry at which Steve is based. This newly named material will fill some gaps in the Society's collection, but it remains to be assessed. Work on the carabids by Mark Telfer has also been completed and they are to be returned shortly.

We have also had one major acquisition during 2004, a gift from our Swedish member Stig Torstenius. We have had for many years an excellent collection of Scandinavian macrolepidoptera donated by him, arranged by the late Brad Ashby and housed in three Hill units. Stig has now donated a further 400 specimens of about 220 species, many of them new to our collection while others provide the other sex of species where only one sex was previously represented. I am indebted to Stig for this kind donation and to Tony Pickles for transporting the collection from Sweden. Tony has also generously offered to rearrange the entire collection so that the additional specimens can be incorporated in appropriate order.

In September I again attended the annual meeting of collection managers. This time it was held at Manchester where it was of interest to see the facilities for their collections. Pest control was again discussed and since we still experience occasional introductions of *Anthrenus*, although not necessarily in incoming collections, we have decided to carry out freezing of all future acquisitions and any items returned after being away for some time, like the beetles and leaf mines that have come back in the past year. When there was a discussion about taking over the exhibition area at the front of our building the installation of a deep freeze was one of the options we

considered for its use. As this takeover has not happened, the Country Park have agreed to us installing a freezer in their barn. This acquisition will be a priority for 2005.

Once again I am grateful to all those who have filled gaps by donating specimens to the Society in the past year and to those who have assisted in other ways, including correction of misidentifications in the collections. I am also appreciative of the regulars who ensure that most of our open days and workshops are lively events, but I also urge all who have not previously made use of our facilities to consider a visit.

PETER CHANDLER

BUILDING MANAGER'S REPORT

It was perhaps too much to expect another year like 2003, in which everything at our headquarters at Dinton Pastures seemed to function smoothly, month after month. Considering the large number of Open Days and weekend workshops that have been held in the Pelham-Clinton Building, we have had few problems, but there have been occasional minor blips with the air conditioning and the strip-lighting, although none of these has disrupted meetings. One mysterious alarm-call (at midnight) was gallantly answered by the Librarian and the police, while the Building Manager slept. No reason for it was discovered, and any annoyance caused was tempered by the value of a 'trial run', and the knowledge that the system still works!

I am grateful to those members who have provided extra cutlery and utensils for the kitchen, and who have helped with the cleaning of the collection-room and the library. There is still a shortage of space. In my last report I expressed hope that this might be solved, at least in part, by the sale of some surplus cabinets after the 'Duplicates Weekend'. This duly took place in April, and for a while the Building seemed blissfully roomy, but BENHS Law states that space created by the removal of equipment and possessions will be immediately filled by the arrival of more boxes, files and journals. There is no doubt, however, that part of the enjoyment of Open Days comes from meeting other members, and a crowded room is more satisfactory than an empty one. There does seem to be enough table-space (and microscopes) for everyone, and all in all the Pelham-Clinton Building is a convenient and pleasant place to have as our headquarters.

During the year the Society has continued to develop a close relationship with the Dinton Pastures management, and an increasing number of members now spend time exploring the beautiful lakes and meadows – and socialising in the café – as well as working in the Building. National Moth Day and Night in May 2004 proved a big success, as BENHS members joined the rangers from the Country Park to combine scientific recording with the teaching of natural history to visitors of all ages. The event was very well received, and we are already making ambitious plans for the 2005 event. The walls of the P-C Building now display many photos of the lakes, flora and fauna of the Park, and of members at work indoors on Open Days and in the field. There is also a distribution-map of the impressive range of clearwing moths to be found at Dinton Pastures.

Although Open Days are well attended, and a growing number of members arrange to come mid-week, I still meet people who say that they have never been to Dinton Pastures because they have no interest in looking at collections, however impressive. Clearly this must be a personal opinion, and I can only stress that there is so much more to offer at the Pelham-Clinton Building; that the library alone is worth a day's visit; and that the Park is beautiful and perpetually interesting. Other members lament that Open Days are always on Sundays, although I have repeatedly

said that I can open the Building midweek for those who would prefer to come then, and that it is a pleasure and not a chore. Those who do visit will discover that whereas the 'indoor' part remains reassuringly the same, Dinton Pastures 'outdoors' varies spectacularly throughout the seasons. Please come and see!

DAVID WEDD

EDITOR'S REPORT

Volume 17 of the *British Journal of Entomology & Natural History* was published in four parts in April, July and October 2004 and January 2005, respectively. Fewer large manuscripts were submitted during the year so the issue length, 256 pages was shorter than in 2003. The Volume length, however, was about average when compared with issues of the journal published over the past ten years.

The experimental technique of incorporating individual colour portraits of insects in the text in magazine format was discontinued in favour of full colour plates. A record number of plates, 14 in all, was published during the year. The majority of these formed the basis of the 2003 Presidential Address given by Basil Harley on the life of the publisher Lovell Reeve (1814–1865). The plates chosen were designed to show the genius of Reeve in employing the best artists and printers of the day and the breadth of wildlife subjects that he covered. Two plates of butterflies and one of *Nomada* bees were also printed in addition to the two colour plates illustrating species shown at the annual exhibition. The cost of preparing and printing the extra plates was met by the generosity of Graham Howarth and Basil Harley.

There were 33 articles in Volume 17 in addition to the standard reports of Society indoor meetings, the Annual Exhibition, and Officers' summaries. Eight species new to Britain and a new form of *Nomada fulvicornis* Fab. were described. Observations of several insects reported in the *Journal* have resulted in follow-up articles, and this extra information has proved beneficial in providing a wider understanding of the biology of these species. This goes to show that ordinary members can make a real contribution to the *Journal*. Two articles even referred to global warming. There were 19 book reviews and one obituary, of Dr John Bradley, an Honorary member of the Society.

Special thanks go to David Young and Roger Hawkins for preparing the Index to Volume 16 (2003). I would also like to thank those members who have given their time on behalf of the Society; in photographing insects (Richard Jones), in refereeing papers, in writing the Annual Exhibition reports and proof-reading.

I look forward to receiving more papers in 2005.

JOHN BADMIN

DIPTERISTS FORUM REPORT

Dipterists Forum have had another successful year in 2004 with membership standing at 278 fully paid up members. A publicity display was organised by our Membership Secretary at the AES Exhibition where six new members joined and copies of our journal *Dipterists Digest* were sold. There are now 262 subscribers to *Dipterists Digest* and colour plates may now be included in one issue each year.

A Dipterists Forum BAP Species Officer has been appointed to review and submit recommendations regarding the review of BAP species of Diptera via Buglife.

The Dipterists Forum Website (<http://www.dipteristsforum.org.uk>) continues to be developed as a publicity and recruiting aid. It is becoming an increasingly useful

resource with the recent addition of a searchable list of the articles published in *Dipterists Digest* and a downloadable version of the current Diptera Checklist of the British Isles.

The Spring Workshop, "Introduction to Acalypterate Families" was successful and well attended. A parallel Workshop "Introduction to the Families of Diptera", aimed at beginners, was less popular. The Dipterists Forum Summer Field Meeting was based at Wiltshire College, Lackham and, as usual, we were joined by some Hymenopterists and Coleopterists. The accommodation and food were among the best we have had on our Summer Meetings. Despite the drought the previous year good numbers of fungus gnats and crane flies were found. Many of the other families of Diptera were less plentiful, but a number of significant finds were made.

The Autumn Field Meeting took place in East Sussex. We were fortunate in having a local dipterist to act as our guide to the excellent sites in the area. Although the weather forecast was for rain each day, it only occurred in our area on the day of arrival, although it rained every night. Reports of these meetings will be published in *Dipterists Digest*.

KEN MERRIFIELD

BEES, WASPS AND ANTS RECORDING SOCIETY (BWARS) REPORT

After a slight decline in membership in 2003 there was an encouraging surge in interest in bees, wasps and ants last year and the society's membership rose to an all time high of 307, of which 274 were paying (as opposed to corresponding) members.

Following the trial of a "northern" BWARS weekend in Liverpool in 2003, last year the meeting returned to the south and was held at the BENHS headquarters at Dinton Pastures. Numbers attending the weekend were high, so much so that the capacity of the Pelham-Clinton building was exceeded and activities overflowed into the adjacent Country Park buildings. In addition to the usual AGM business, workshops were held on separation of the black *Lasius* ants and the various members of the *Chrysis ignita* (L.) group, both as a follow-up to the preliminary investigations of the previous year. Beginners were catered for by a workshop on identifying bees to genera, at which two new generic keys were tested. Members' talks included an introduction to a Europe-wide project to investigate declines in pollinating insects (ALARM), an overview of research into soft rock cliff faunas in Wales, a description of the foraging activity of *Vespula vulgaris* (L.), and an account of recording aculeates in Shropshire.

As in previous years there were no BWARS field meetings, but members were invited to the summer field meeting of Dipterists Forum held in Wiltshire in early June.

Two newsletters were published during the year, the second extending to some 60 pages. Contents included society business, discussions of the BAP review and the use of members' data in the NBN, draft species profiles for the provisional atlas, notes from around the country and book reviews. Although both Atlas 5 and the newly revised members' handbook had both been completed, neither appeared due to delays at the publishers. They are expected to be available early in 2005 and will be circulated to all fully paid up members.

During the year BWARS distribution data was provided to the Aculeate Conservation Group, RSPB, the National Biodiversity Network, the Irish Bee Biodiversity Project, ALARM, the Natural History Museum and Buglife.

GRAHAM A. COLLINS

PRESIDENTIAL ADDRESS PART 1: REPORT

MIKE WILSON

*Head of Entomology Section, Department of Biodiversity & Systematic Biology,
National Museums & Galleries of Wales, Cardiff CF10 3NP*

Like others before me in this position I do not intend to depart very far, if all, from the usual format of this report. As outgoing President I am 'allowed' to comment on wider aspects of Society business, or on those aspects not covered by the Council and Officers reports given by others and to put the Society year into a wider context – and that I intend to do.

Although we are a largely amateur Society we are a registered charity, a situation that gives certain advantages as well as wider responsibilities. The "promotion of entomology" is clearly one of our charitable responsibilities, a position we share with other, 'professional' entomological societies. However, it is frequently difficult to present the relevance (let alone significance or importance) of what we do, as a hobby or even as a full-time entomologist to a wider public. Indeed many members may well consider it unnecessary even to begin. Many organisations have 'mission statements' – usually of mind numbing mediocrity. I am pleased that scientific societies have generally not yet succumbed to this trend. However, the Entomological Society of America newsletters include the phrase "Entomology: A proud profession" I wonder if anyone is convinced?

But a certain sector of the public is genuinely interested in our activities – either leisure or professional – although as professionals it might be a case of 'you get paid to do that?' The public do seem interested in the idea of finding new species – whether new to Britain or undescribed; and in the idea of naming species. It is more of a challenge to explain rules of nomenclature. The general public are also certainly interested in entomologists being able to see signs of climate change using insect examples and to use invertebrates in conservation discussions. I do worry though that the conservation debate is carried on at a relatively esoteric level when the vast majority of the public are very unlikely now to be able to identify even the commonest plants and animals. Even more worrying is that they don't seem to care.

It is a continuing challenge to find new ways to engage wider attention in any scientific activities and to show their relevance. Several events took place in 2004 that are partly or wholly designed for a better public understanding of the breadth of interest and importance in the study of entomology.

Spring 2004 saw the official launch of Buglife, The Insect Conservation Trust (even though it has been in operation for a couple of years). The launch, held at the Wetland Centre, Barnes, ensured good publicity by inviting the natural history presenter Nick Baker to be President and having Professor Germaine Greer and Professor Edward Wilson as Vice Presidents. At the launch, Lord May, the current President of the Royal Society, stressed again the importance to global life of invertebrates. We wish Buglife future success in its aims to "prevent invertebrate extinctions and to maintain sustainable populations of invertebrates in the UK".

National Insect Week, in June 2004, was the first event to attempt to promote the study of insects at a national level. It was initiated by the Royal Entomological Society, with collaboration with the Natural History Museum and sponsors and invited linked events with other Societies and Institutes, which included BENHS.

The events during the week gained some good press coverage and the week seemed generally very well received. It will be repeated again in 2006 so there is an opportunity for other Societies to plan or link field meetings or activities that could involve the public. This includes such events as the well-established National Moth Night (organised by Butterfly Conservation) which occurred during National Insect week in 2004.

The communication of our interests in insects occurs at various levels. Interactions with the general public usually form a small part of communicating our interests. For many it is social contacts with friends and colleagues to discuss entomological interests that is more important. Indeed it may have been an important reason we joined this and also join other societies.

2004 was also the year of the International Congress of Entomology (ICE), which coincides with the Olympics every 4 years. Also like that sporting event, countries compete and bid to hold the next one. They are also quite a marathon. This year it was in Brisbane, Australia and around 3000 entomologists gathered for a week in August to participate in multiple parallel sessions of huge diversity. One day was devoted to public talks and activities and each morning started with wide-ranging 'plenary' talks often of significant wider public interest. Brightly-coloured Congress backpacks were issued to all and it was interesting to see them throughout the city and beyond during that week. It was also pleasant to come across old colleagues (and new ones) by just walking around the city centre. A significant number of delegates combined attendance at the Congress with visits to the Brisbane Museum to examine the collections and even carry out some collecting (permits allowing).

Some entomologists dislike such large gatherings, preferring only to attend specialist meetings. But at such large meetings, as the ICE, it is possible to widen personal general knowledge of topics and to hear presentations from leaders in their fields. At a smaller scale our Society meetings offer the opportunity to hear a wide range of talks through the year as well as specialist workshops, field meetings and the Annual Exhibition. It could be considered a microcosm of the study and pursuit of entomology in the UK.

You have already heard the reports from officers of the society and again I would not wish to depart from tradition in thanking a number of individuals for their contribution to the Society. Margaret Thatcher famously said there was "no such thing as society, only individuals" whatever she did actually mean by that phrase there would certainly not be a Society without the individuals who keep the BENHS moving forward.

On behalf of Society members I would very much like to thank all Council members and Officers for their contributions to the effective running of the Society in 2004. Among all of these I would like to thank: John Badmin for editing the Journal with patience and good humour (which is much needed at times); David Young for co-ordinating the sending of Journals and maintaining the website; Ian McLean for organising the Indoor Meetings Programme and for coordinating the Publications Committee; Paul Waring for arranging the field meetings programme; David Wedd for looking after Dinton Pastures and Peter Chandler and Ian Sims the insects and library housed there, and Tony Pickles as Treasurer continues to ensure the finances of the Society are run smoothly. I dare to single out the Secretary John Muggleton for personal thanks for his assistance during the year and guiding me through the various duties as President. It has been an interesting and enjoyable year that has passed very quickly.

It is the sad but inevitable duty to record the passing of some members during the year. In the past twelve months we have noted the deaths of the following.

DEATHS IN YEAR

Dr D.B. Baker. A Special Life Member, who had joined in 1939.

Mr E.P. Wiltshire. A member since 1967. Died in September at the age of 94. Spent over 40 years in the Consular service, mostly in the Middle East, but also in South America and Europe. Ted Wiltshire made extensive studies of the Lepidoptera of the Middle East, and published the *Lepidoptera of Iraq* in 1957. In retirement he was a frequent visitor to the Entomology Department of the Natural History Museum. Ted Wiltshire was also Editor of the Society's Proceedings (1976–1980).

V.W. Philpott of Ashford, Kent. Special Life Member (joined 1946). Interested in Lepidoptera.

John Robbins of Porlock, Somerset. Member since 1989. Interested in Microlepidoptera.

Mr J. Michael Chalmers-Hunt of West Wickham. Honorary Member and twice President. Joined in 1946. Apart from Lepidoptera he was especially interested in the history of entomology and his publication on Natural History auction catalogues is of fundamental importance in tracing the fate of early collections sold at auction.

Dr D.H. Howton of Northants. A member since 1994 and interested in Lepidoptera, Hymenoptera and Coleoptera.

Peter Alan Lees, died January 2004 (notified April 2004).

The Hon. Miriam Rothschild of Ashton Wold, Peterborough, a member since 1964.

Dr P.F.G. Twinn died in October 2004 aged 88. A member since 1962. Peter Twinn was a wartime cryptographer and the first Briton to break an Enigma cipher. Twinn became interested in entomology after the war and studied the jump of the click beetle for a PhD.

Sir John Dacie FRS died February 2005 aged 92. John Dacie had been a member since 1956 and was interested in Lepidoptera as a hobby. In his professional life he was one of the most influential haematologists in the world.

I have already asked you to stand in memory of these members so I will not ask you to do so again.

I suspect that entomologists are a fairly optimistic group of individuals looking forward each year to seeing new habitats or visiting new localities or of course visiting familiar sites to see what changes are occurring. The coming year will see the demolition of the building housing the Entomology Department in the Natural History Museum. There will be many happy memories of that building, its staff and collections for many of us and for colleagues around the world. We can only hope that when the "Darwin Centre II" is built on the site and the collections are again together it will provide facilities that will fulfil all expectations.

Among the various topics discussed at Council during the year most cover the routine aspects of the yearly cycle of activities; field meetings, indoor meetings, the annual exhibition and the Journal. Towards the end of the year Council discussed what Members 'got out of the BENHS' and did the Society know what members thought of it and its activities. From these discussions has come the development of a simple questionnaire. In order to plan for future developments of the Society the Council would like to know what Members think about various aspects of the activities from the Journal to the website. This questionnaire will be distributed in early 2005 and we look forward very much to your views.

In deciding on a topic for the Presidential Part 2, the subject I wished to avoid discussing was the biology or taxonomy of my own research interests, thinking them to be of rather narrow appeal. I decided instead on attempting to review an aspect of change that has affected us all over the past few years – Entomology in the digital age.

BENHS INDOOR MEETINGS

14 September 2004

The President, Dr M.R. WILSON, welcomed members of the London Natural History Society to the tenth Brad Ashby Memorial Lecture meeting. He announced the deaths of Mr J. Robbins, Mr E. Wiltshire, Special Life Member Mr V. Philpott and Honorary Member Mr J. Chalmers-Hunt.

Mr R. UFFEN showed a specimen of the picture-wing fly *Rhagoletis meigenii* (Loew) (Diptera: Tephritidae). This was one of two females found on foliage of *Berberis thunbergii* DC seen in a garden at Welwyn, Herts on 17.vii.2004. Some of the mature berries contained a single fully-fed larva. The only other recent record of this fly in Britain was a specimen taken by Richard Jones in Battersea Park, London.

Mr R.D. HAWKINS showed a live male wood cricket, *Nemobius sylvestris* (Bosc) found in the Forêt de Crécy in northern France on 24.vi.2004. It had been fed in captivity on a diet of lettuce and dead insects with a little apple. Mr O. Crundall noted that *N.sylvestris* had been found recently on Bookham Common in Surrey. Previous records from the county showed it to be confined to Wisley Common and the adjacent RHS Garden.

The following were approved as members: Dr Howard A. Bell, Dr Jacobus C. Biesmeijer, Mr Peter A. Clarke, Mr Peter N. Floyd-Spong, Dr Andrew M. George, Mr Andrew Grayson, Mr Derek Hallett, Mr Gregory R. Hitchcock, Mr Duncan E. Jackson, Mr Peter M. MacDonald, Mr Neil E. Marks, Mr Peter D. Masters, Mr Mark R. Payne, Miss Patricia M. Walker and Miss Claudia M. Watts.

Mr A.J. HALSTEAD reported he had found a cluster of first instar nymphs of the Southern green shield bug, *Nezara viridula* (L.) on runner beans on his allotment at Sheets Heath, Brookwood, Surrey. This insect was reported as breeding for the first time in the UK during 2003 in some London localities. Dr Wilson said that samples of *N. viridula* have been sent to the Natural History Museum from Kent. This insect has a world-wide distribution but there is some variation in the acoustic communication it produces in different parts of its distribution.

Dr WILSON also reported that a search for leafhoppers at Pant-y-Sais fen, near Swansea the previous week had produced few specimens, although the site had produced good results in early September in previous years. This may indicate an early end to the 2004 season, or a consequence of either the wet weather in August or the drought last summer. Despite the lack of leafhoppers, the giant raft spider, *Dolomedes plantarius* (Clerck) was seen at its third UK locality.

Mr S. MILES reported he had recently seen the wasp spider, *Argiope bruennichi* (Scopuli) in Hanworth Air Park, West London.

Mr EDWARD MILNER, the London Natural History Society spider recorder, gave the tenth Brad Ashby Memorial Lecture. His subject was "Spiders in Urban London". London's spider fauna is relatively well known but changes are occurring due to factors such as climate change, loss of habitat and changes in the way habitats are managed. A species of jumping spider new to Britain, *Macroeris nidicolens* (Brown) was found on Corsican pines at Mile End Park in 2002. Some species had been rediscovered after a long period of no sightings. A good example was the tube web spider, *Atypus affinis* Eichwald, recorded by Bristowe on Hampstead Heath in the last century. After careful searching, the speaker was able to locate suitable habitat on Hampstead Heath and was able to find the spider again. The use of pit-fall traps on Black Heath recorded two specimens in 2003. Some spiders were expanding their range. The wasp spider, *Argiope bruennichi* (Scopuli) used to be confined to the south coast but had now spread

northwards up to Warwickshire. It had now been found in five London sites, including Hampstead Heath and Alexandra Park. This spread could be due to global warming. This spider preys mainly on grasshoppers in long grass and it may be benefiting from a greater abundance of prey. The orb web spider, *Neoscona adiantum* (Walckenaer) had also expanded back into London recently, possibly recolonising in response to cleaner air in central London. Reduced frequency of mowing in some London parks has benefited some spiders, such as *Larinioides cornutus* (Clerck) and *Pisaura mirabilis* (Clerck). The speaker stressed the importance of allowing vegetation to grow up in order to provide places where spiders can spin their webs.

In addition to recording spiders on plants, the speaker had been using pit-fall traps. These were used to provide monthly samples and to provide a standardised recording technique. Such traps help detect under-recorded species that are active in autumn and winter. Pit-fall trapping can indicate changes in the spider fauna in relation to changes in site management, and also allows comparisons to be made between sites.

9 November 2004

The President Dr M.R. WILSON opened the meeting.

Mr R.D. HAWKINS showed a male hornet, *Vespa crabro* (L.). This was one of many flying around a clump of trees in Reigate, Surrey on 6.x.2004.

Mr A.J. HALSTEAD showed a live *Oncomera femorata* (F.) (Col.: Oedemeridae) swept from shrubs at Fairlight Glen, Hastings Country Park, Sussex on 15.x.2004. This is a local beetle in England and Wales. It is active at night and often found on the flowers of ivy and willows.

The following persons were approved as members by Council: Mr C. A. Searle, Miss J. Locke, Mr T. Fayle, Professor M. Burrows, Mr B. Blagden, Mr J. H. Bentley, Mr R. B. Angus and Mr K. Ward.

Mr R. UFFEN referred to his observation of dead bumblebees near a *Cotoneaster* that he had reported at the September indoor meeting. It had since been suggested to him that the bees may have been killed by hornets. Mr R.D. HAWKINS asked why bumblebees are sometimes found dying under lime trees. Mr HALSTEAD replied that the type of lime usually associated with this phenomenon is *Tilia* 'Petiolaris'. The nectar of this plant contains a sugar called mannose that bumblebees cannot metabolise. Their digestive enzymes become irreversibly locked onto the mannose molecules, causing bumblebees to starve even though their stomachs may be full of nectar. Honey bees and many other insects also feed at *Tilia* 'Petiolaris' flowers but do not seem to suffer this fate.

Mr MIKE EDWARDS spoke on the subject of whether insect assemblages can be used as a monitoring tool to assess sites and contribute to management plans. Compared with plants, birds and mammals, insects and other invertebrates present problems when a conservation site is being surveyed. They may be difficult to find or identify, and their abundance cannot be easily assessed. Many sites will have some sort of insect list but this may be nothing more than a list of species. Species lists of insects need annotating to provide site managers with information, where available, about habitat requirements, geographical range and conservation status. Insect surveys need to record the common species as well as rarities, since it is the more common, and hence more easily found species that define the broad invertebrate habitats. Animals higher up the food chain usually depend on the more common species lower down, rather than feeding on rare species. No insect in the UK is dependent on the Lady's Slipper Orchid, although that plant may need insects for pollination. It is those species in the middle range of scarcity that are

likely to be most helpful in assessing a site. These species may occur at low densities over a wide area or may be relatively abundant under certain localised conditions. They often have specific needs and it is these species that form the backbone of the idea of assemblages, i.e. groups of species that might be found together in roughly similar situations.

Defining habitat types in too much detail can lead to problems. Broad descriptions, such as heathland, deciduous woodland or grassland are useful starting points that can be sub-divided to bring in other characteristics, such as vegetation types, soil moisture and aspect. When recording species assemblages, it is advisable to base the assemblage on a wide range of insect Orders. This may require the involvement of several entomologists to provide the necessary specialisms to cover the principal invertebrate groups found on a site. There is a danger that management plans may be based on "flagship" species in the belief that what suits those particular species will also benefit others that live in similar habitats. That may be true but ecosystems are usually much more complex than that.

The speaker's interest in insect assemblages began when he and Peter Hodge were involved in a survey of West Sussex heathlands in 1993. When the data were collated from this and other surveys carried out earlier, including one in 1992 by Francis Rose, it was clear that some species were present on many sites, while others were apparently on only a few. This led to a consideration of whether combinations of the scarcer species could be related to habitat features on the heaths. Lists of "Indicator species of West Sussex heathlands" were compiled according to the habitat features these species required. These were tabulated against the sites being surveyed and the decade during the 1970s, 1980s and 1990s in which the indicator species had been most recently recorded. Consideration of the recording effort and the presence of suitable habitat features allows individual sites to be described in terms of their features for invertebrate assemblages and to predict what extra species might be present. The West Sussex heaths survey was repeated in 2003–2004. The indicator species identified in the earlier survey were still present, although not necessarily on the same sites. Nevertheless the basic assemblages have proved reasonably consistent and can be used to indicate whether a site has gained or lost important features. This means that site managers can be given better guidance on what is needed to maintain habitats.

The speaker said that, in his experience, vegetational succession, both in terms of species and structure, will take place, whatever efforts are made to halt the process. The role of management should not be to arrest the succession process but to allow it to proceed and then restart it. This implies destroying one habitat to create another. The single most important thing for management is not to do the same thing everywhere at the same time – variety is the spice of life!

11 January 2005

The President, Dr M. R. WILSON chaired the meeting.

Mr R. D. HAWKINS showed on behalf of Mr P. J. HODGE a male *Phosphaenus hemipterus* (Goeze) (Col: Lampyridae) collected 24.vi.04 in the Forêt de Crécy, Somme, northern France. This was one of at least six swept from the grassy verge of a forest track at midday. Half an hour later, none could be found. This beetle is rare in Britain; it might be worth sweeping known sites at midday to see if it can be found more easily.

The following persons were approved as members by Council: Mr Robert Gaffney, Mr Jason Gosling, Miss Sophie I. Hine, Mr Malcolm W Humphries, Mr Roger James, Mr M. Killeby, Mr Simon M. Knight, Mr Richard M. Lyszkowski, Dr Andrew Mitchell, Mr Richard Price, Mr Ian C. Cross and Mr Stuart G. I. Cole.

Dr ALAN STEWART spoke on "Glow-worms and light pollution—an urban myth or insidious threat?" There are three species of glow-worm in Britain, of which *Lampyrus noctiluca* (L.) is the only widespread species. It has a two-year life cycle spread over three years. Eggs are laid in the soil in June–July and these hatch in late summer. The larvae feed on snails, doing most of their development in the second summer and pupating in the following spring. The adult beetles do not feed and are short lived. The females are flightless; this means the species has limited dispersal powers and is vulnerable to changes in land use.

The female beetles emit a cold whitish green light from the last three abdominal segments as a means of attracting males. Male beetles and the larvae can also emit light. The females crawl up plant stems in the evening and begin to glow when it is fully dark. After mating has taken place females stop producing light. Males have colour vision and locate glowing females by sight.

Glow-worms appear to be in decline. They are under threat from habitat destruction or deterioration because of vegetation succession. Habitat fragmentation is also a problem. Light pollution is a growing problem that may be affecting glow-worms. Low-pressure sodium street lights produce an intense light in a narrow colour spectrum. High-pressure sodium lights give a less intense light over a wide spectrum, including short wave. Male glow-worms respond most strongly to the yellow-green part of the colour spectrum, similar to the light produced by female glow-worms. Males are inhibited by short wave light and so may be affected by high-pressure sodium lights. Females do not glow during the day and could be affected by lighting at night. Females glow on average for about 30 minutes but may do so for up to three hours. Producing light has a metabolic cost and longer periods of glowing may result in reduced fecundity because of delayed mating or reduced female body weight.

SHORT COMMUNICATIONS

Additional records of *Dolerus megapterus* Cameron (Hymenoptera: Tenthredinidae) from Wiltshire.—Jonty Denton and Graham Collins recently reported the occurrence of this rare sawfly in carr woodland adjacent to the Kennet & Avon canal in Berkshire (*BJENHS* 18 (2005): 44). I collected single males of this species at a fenland site near Pewsey, Wilts. on 7.vi.2000 and from North Meadow NNR, near Cricklade, Wilts. on 12.vi.2001. Interestingly the former site is close to the banks of the Kennet & Avon Canal.—K. J. GREARSON, 10 Eastfield, Ashton Keynes, Swindon, Wiltshire SN6 PR.

Winter occurrence of *Eupteryx filicum* (Newman) (Hemiptera: Cicadellidae) in east Kent.—This leafhopper appears to be common in suitable areas of southern and western England including Kent. Nymphs and adults feed on a range of ferns often causing appreciable frond damage. According to the RES Handbook on Cicadellidae (Le Quesne & Payne, 1981) *E. filicum* occurs as late as September and October. Adults of this species were swept from male fern *Dryopteris filix-mas* in Perry Woods, Selling on 28.xi. and 10.xii.04, 16.i.05 and 3.ii.05 indicating that a proportion of individuals survive through the winter months. In east Kent, snow fell virtually every day for two weeks during late February–early March (up to 2 m recorded in Slade hamlet higher up on the Downs) causing structural damage to plants. The ferns were totally crushed and no live *E. filicum* was found once the snow had receded.—J. S. BADMIN, Coppice Place, Selling, Kent ME13 9RP.

ANNOUNCEMENT

A change to our library loans policy.—For some time now members have suggested that we prohibit the loaning of journals from the library. The reasons for this move are:

- to prevent the inconvenience to visiting members wishing to consult a specific reference, only to find that another member has it out on loan
- to increase security, as old journal numbers are hard to replace
- this is common practice in other libraries.

In response to this suggestion, last year I put a questionnaire in the library to canvas the opinions of library users on this issue. The results showed that a small majority (13 for, 11 against) were in favour of prohibiting loans of journals.

Analysis of trends in loaned material over the past few years (Fig. 1) shows a decline in journal loans, and a corresponding increase in book loans. Annual journal loans, as a percentage of total annual loans, have fallen from 48% in 1989 to just 16% in 2003, and remained at this level in 2004. Therefore, on the basis of usage and of the opinions expressed by library users, I wish to take this opportunity to announce a change in our policy regarding journal loans.

From 30 June 2005 members will no longer be able to borrow journals from the library. However, Council has authorised me to make two exceptions to this rule.

- 1) Titles that we have duplicates of (*Entomologist's Record and Journal of Variation*, and the *Entomologists Gazette*), one set will be **reference only**, the other set may be borrowed.
- 2) If members have specific research needs, which involve the intensive use of journals, they can contact me regarding their requirements and I will endeavour to arrange a limited loan period with them. This arrangement will be for a trial period. It will be reviewed if there is no demand for it, or if the practice proves disruptive for other library users.

Personally speaking I hope this does not interfere with the research needs of members, but feel that the time for this change is now right. Also, I would like to ask all members with journals out on loan to return them as soon as possible so that a stock take can be undertaken by the end of the year.

IAN SIMS (Hon. Librarian)

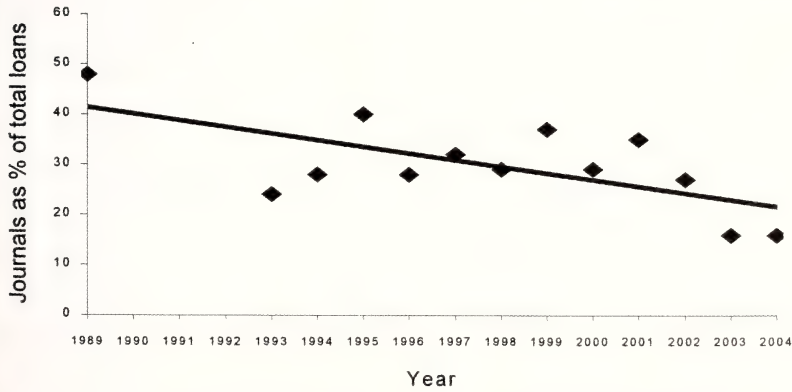


Figure 1. Trend in percentage journal loans vs total loans, 1989–2004.

THE TORSTENIUS COLLECTION

Many members will be familiar with the 'Torstenius Collection of Scandinavian Lepidoptera' which is housed at Dinton Pastures. Stig Torstenius of Stockholm, Sweden, a special life member of this Society, donated this collection to us some years ago at the instigation of the late Brad Ashby. The majority of his private collection has now passed to the Stockholm Museum but he has kindly made a further donation to the British Entomological & Natural History Society.

I recently had the great pleasure of visiting him at home in Stockholm and receiving on behalf of the Society four store boxes of additional insects. These comprise some 60 species of macro lepidoptera not previously represented and many additional specimens and forms. It is hoped that these will be curated into the existing collection during the winter of 2004 to 2005.



We express our sincere thanks to Stig and to the other Scandinavian lepidopterists who have participated in this gift.

TONY PICKLES

OBITUARY

EDWARD P. WILTSHIRE 1910–2004



Ted Wiltshire has passed away at the ripe old age of 94—very possibly unknown to most younger readers of this journal. He was one of England's most prominent 'amateur' entomologists, mostly dealing with butterflies and moths from further afield than Europe. He was editor of the *British Journal of Entomology and Natural History* from 1976 to 1980.

A typical middle class education culminated with graduation in classics from Jesus College, Cambridge. Again—typically—his education had involved the collection and study of butterflies and moths, its effects rather more enduring than usual.

In 1932 he joined the Consular Service and held a large number of increasingly senior postings in Beirut, Mosul, Baghdad, Tabriz, Ahwaz, Teheran, Kermanshah, Cairo, Bahrain, Buenos Aires, and Geneva. In 1967 he was posted to London with a brief detour to le Havre.

During this time he travelled much—what did a British consul in Kermanshah in the 1950s actually have to do apart from some mild gathering of intelligence?—and collected butterflies and moths along the way. He published the most detailed accounts yet of the Lepidoptera of Lebanon, Iraq, Egypt and Bahrain which remain primary sources to any study of these faunae. He also wrote numerous smaller papers, some of a technical nature but many of general information.

During the 1970s he fortuitously became associated with the fauna of Saudi Arabia project and published many papers, culminating in an up-to-date list of all the moths of the Arabian Peninsula. He ceded the butterflies to me. I am not sure how many new moths were described as part of the Arabian project, but it might well exceed 100—in addition to the clarification of the status of many others.

I was first in touch with Ted in 1974 when living in Lebanon. I was preparing a book on the butterflies of that country and had just—with considerable pride—published a paper demonstrating that *Allancastris cerisyi* (Godart) in Lebanon



Wiltshire on consular duty. His *Lepidoptera of Iraq* was first published in 1944.

consisted of two distinct species. A letter arrived from Ted congratulating me on solving a matter about which he had had suspicions so vague that he never committed them to paper. I was dumbfounded. With the short time horizons of youth and since the Lebanon butterfly paper was published seven years before my birth, I had assumed he was long-since dead. Well, he was not. We had many long and interesting discussions about the fauna of the Middle East and Arabia. We last met in 2000 at the Royal Entomological Society in London. He insisted that we walk down to the closest pub for a beer and a more informal chat than could be had in those august halls.

Ted Wiltshire described his life in a series of autobiographic reminiscences cited below. They show the amazing changes between the world of the 1940s and the end of the 20th century.

TORBEN B. LARSEN

Edward Wiltshire was a true gentleman and one of the best amateur lepidopterists of the 20th century; his production was exceptional. He was a wonderful nature observer and he liked to share his knowledge; he was for me an example, a guide, a master, and I had the high honour to be his friend and I will not forget him. A new *Cucullia* species (Noctuidae), endemic to South-West Arabia, will be dedicated to him soon, and probably an African *Acontia* as well, as he had a special interest in the two genera.

ALBERT LEGRAIN

SELECTED AUTOBIOGRAPHY

1991. *Entomologist's Record and Journal of Variation* **103**: 63–68, 119–124, 175–180, 251–256, 307–312.
 1992. *Entomologist's Record and Journal of Variation* **104**: 33–38, 71–74, 149–154, 203–206.

FIELD MEETINGS

Saltfleetby–Theddlethorpe Dunes NNR, Lincolnshire, 1–3 June 2004

Leader: Paul Waring. – The aim of this event, which took place over the nights of 1/2 and 2/3 June 2004, was to achieve large-scale light-trapping cover of the Saltfleetby–Theddlethorpe Dunes NNR now that recent surveys have shown that this may be the only remaining site in the British Isles to support the Marsh Moth *Athetis pallustris* (Hbn.) (see Waring, 2004a,b). During the 1970s the Marsh Moth was also recorded from three other sites in Lincolnshire (Pilcher, 1971, 1973). These were Calceby Beck Marsh, Swaby Valley Marsh and Gibraltar Point. The first two sites do not appear to have been searched for the Marsh Moth since Pilcher's work in the 1970s until Waring (2001) light-trapped at Calceby Beck Marsh on 13 & 27 June 2000 & 15 June 2001 and at Swaby Valley Marsh on 13 June 2000, following this with the well-known technique of litter-piling for larvae of this moth at Calceby on 6 September 2001 and at Swaby on 6 September and 19 October 2001. All these searches produced negative results. In contrast, the Marsh Moth has been recorded at Gibraltar Point regularly up to the mid 1990s. A singleton on 17 May 1997 (Kevin Wilson) appears to be the most recent record. However, a BENHS field meeting involving 11 light-traps on 16 June 2001 (Waring, 2003) failed to find the moth, as did further light-trapping with 9 light-traps on 23 June 2001 (Adrian Russell & Ron Follows) and on apparently similar habitat on the adjacent Seacroft Golf Course with 10 light-traps on 6 June 2002 (Adrian Russell & Ron Follows). Likewise, litter-piling at Gibraltar Point in October 2000 (PW) and August & September 2001 & August 2002 (Gerry Haggett & PW) was unsuccessful. Another promising site of similar habitat exists at Red Farm Flash near North Somercotes on the Lincolnshire coast just north of Saltfleetby and this was also explored during two BENHS field meetings, again with negative results (see Waring, 2005a). The history, status and ecology of the Marsh Moth at these and other sites has been reviewed by Waring (*Entomologist's Gazette*, in press) and this covers the unsuccessful efforts to find the moth at such well-known sites as Woodwalton Fen, Huntingdonshire, and Chippenham Fen, Cambridgeshire, where the Marsh Moth has not been recorded since the 1960s. There have been many attempts to refine the moth on these fens and indeed the leader organised BENHS field meetings aiming to do so on 3 & 17 June 1989 without finding this species (see Waring, 1996).

This field meeting was held jointly by the BENHS, Butterfly Conservation and the Amateur Entomologists' Society and was advertised in advance notices in the journals of the latter in addition to inclusion in the BENHS field meetings programme. Twelve people joined the leader for the first night and a different group of nine joined him for the second night. Earlier visits in 2004 by Mark Parsons and Tony Davis from Butterfly Conservation on 27 May and by Sean Clancy on 28 May had already confirmed the moth was flying in the Sandbanks Meadow dune-slack from which it has been recorded every year since 2000 by the leader. Mark and Tony recorded about fifty species of macro-moths, including one Marsh moth, a slightly worn male, despite a cold night with a slight frost. They had operated five MV traps in the meadow, one in the adjacent sand-dunes and one near the small area of reeds in the field to the west of the meadow – the trap-site being only about 20 m from the entrance gate. The Marsh moth was in this last trap, where it has not been recorded previously. One Marsh Pug *Eupithecia pygmaeata* (Hbn.) was also recorded. Sean Clancy operated five traps the following night, all around a clump of *Hippophae*

rhamnoides L. (Sea Buckthorn) at the north end of the Sandbanks Meadow, the traditional site, on a mild, dry night. His total was 65 species of macro-moths including seven Marsh Moths. All seven arrived between 01.30 and 03.30h, evenly distributed between the traps, and were mostly rather worn, which surprised both Sean and the rest of us. Sean also recorded a single Sand Dart *Agrotis ripae* (Hbn.).

The good attendance on 1 and 2 June enabled us to cover the following additional parts of the NNR, from north to south to determine how widespread the Marsh moth might be on this large site, as well operating traps at Sandbanks as a control:

- (a) the reclaimed field to the north of the traditionally known breeding grounds, which is being restored from arable land to habitat resembling the breeding area.
- (b) the central part of the reserve, known as Rimac, which is immediately south of Sandbanks Meadow.
- (c) the extreme southern part of the site, known as Churchill Lane.

The leader took everyone attending to the proven breeding grounds, where he has found confirmed larvae to show all parties the nature of the occupied sward before dividing people into groups. They were now able to recognise and select similar habitat for investigation elsewhere on site. PW displayed and distributed site maps showing where he and the assistant site manager, John Walker, had identified suitable trap-sites during reconnaissance earlier in the day.

The night of 1/2 June 2004

On this first night we had nineteen light-traps operating. This comprised two light-traps in the habitat restoration field (Roger Labbett & PW), four in Sandbanks Meadow (PW, Alec, Leslie and Lucy Kolaj), one on the other side of the gate from the south end of Sandbanks into the field to the west (Alec), five all night and one until 01.00h at Rimac (Peter Clarke, Adrian Wander, Peter Hutchinson and Geoff Wright) and six at Churchill Lane (Paul Bryant, Matthew Deans, Lee Gregory, Roger Labbett and Colin Smith). Male Fox moths *Macrothylacia rubi* (L.) were patrolling before dusk as we set up the traps. As darkness fell we kept in contact using mobile phones. The night started well. It was calm and dark at first and there were soon swarms of flies around the lamps. Common Swifts *Hepialus lupulinus* (L.), Green Carpet *Colostygia pectinataria* (Knoch) and Small Elephant Hawk-moths *Deilephila porcellus* (L.) were quick to arrive. We came across two Natterjack Toads *Bufo calamita* L. moving along the paths and others were heard calling. However a mist formed and a bright moon arose by midnight. The first Marsh Moth of the night was recorded at 00.30h at Rimac. From then onwards the light-traps were left to run all night while we slept in our cars. The leader rose at 03.30h for a short walk round but there was little evidence of moths flying at this time. No Marsh Moths were seen at the Sandbanks traps, the restoration field or Churchill Lane but a total of six individuals, all males, was recorded at Rimac. These had all arrived between 00.30 and 03.30h. Four of them were in one Skinner trap at Site A at the base of a huge conical sandhill and two in another trap nearby at Site B, both in traps belonging to BENHS member Peter Clarke. The Marsh Moths arrived after the mist had formed. All the Marsh Moths were in good condition but only one was immaculate, the others having some signs of wear on the fringes or scales. An important feature of both trap-sites was their height up away from the marshy ground (about 17m). Both were in swards that are grazed annually but are not cut for hay, and in this they differ from Sandbanks. The sites are shown in the accompanying photographs.



Fig. 1. Rimac Site A (TF 4691091669) (above) and Rimac Site B (TF 4696991657) (below), Saltfleetby–Theddlethorpe Dunes NNR, Lincolnshire, 2 June 2004. Peter Clarke and Adrian Wander standing by light-trap containing Marsh Moths.

Sward heights were measured at both sites using the Boorman drop-disc method slightly modified by dropping the 30 cm hardboard disc freely from waist height (see Waring, 1992 for illustrated description). Other noteworthy moth species in the catches included the White Colon *Sideris albicolon* (Hbn.) (e.g. Peter Clarke trapped six individuals and Adrian Wander five), Dog's-tooth *Lacanobia suasa* (D.&S.),

Light Brocade *L. w-latinum* (Hufn.), Small Clouded Brindle *Apamea unanimitis* (Hbn.) and Grass Rivulet *Perizoma albulata* (D. & S.). As an indication of the productivity of the night, 100 macro-moths of 24 species were captured by the Robinson trap fitted with 125 W MB/U bulb operated just to the north of the clump of scrub at the north end of Sandbanks and 125 individuals of 20 species in a similar trap just to the south of the clump (PW).

After the traps had been packed away and breakfast eaten, the leader, accompanied by Peter Clarke and Adrian Wander, spent part of the morning photographing the sites, measuring sward heights and recording other botanical details. Most of the Rimac area where the Marsh Moths were captured and the meadow at Sandbanks produced sward height measurements in the range 7–21 cm, average 13 cm, except at Rimac Site A where sward heights were up to 29 cm. Later the leader drafted notes upon which to base this report and a more detailed one for Butterfly Conservation's Action for Threatened Moths Project (Waring, 2005b). By this stage butterflies were well on the wing on what developed into a glorious sunny afternoon with a clear blue sky. In Sandbanks Meadow the Common Blue *Polyommatus icarus* (Rott.) was the most numerous species. Green Hairstreak *Callophrys rubi* (L.), Small Copper *Lycaena phlaeas* (L.) and Small Heath *Coenonympha pamphilus* (L.) were also seen. A Red Admiral *Vanessa atalanta* (L.) was seen sun-bathing on a tree-trunk. After an outdoor camp meal it was soon time to welcome arriving lepidopterists for a second night of light-trapping, in which we were wondering whether the pattern of results from the previous night would be reinforced or not.

The night of 2/3 June 2004

On this second night eighteen light-traps were operated. The leader set up two Robinson light traps again in the traditional spot by the clump of sea buckthorns in Sandbanks Meadow. Paul Chapman operated three MV light-traps in the grassy dunes on the seaward side of Sandbanks Meadow, where Ribwort Plantain *Plantago lanceolata* L. (the larval foodplant) was also frequent. Colin Hutchinson also operated an actinic trap in these dunes for part of the night. Roger Labbett operated one MV trap in the habitat restoration field, assisted by John Janes. Peter Clarke operated his two MV traps in the same productive area at Rimac as on the previous night. Glen and Lana Summers operated four MV traps in similar habitat between the large vegetated mounds of sand at Rimac, just north of Peter Clarke's operations, using their four-wheel drive vehicle to reach the northern-most hollow several hundred metres north of the Rimac car-park. Churchill Lane was covered by Vats Jaros and Tony Rouse operating five MV lights.

The air temperature at dusk was 10°C, falling to 8°C by 23.00h. It was a dry night and the wind had dropped. Initially it was very dark but the sky was clear and when the low yellow, near full moon rose after midnight, it shone brightly, and a mist formed. The temperature continued to fall and a minimum of 4°C was recorded by the leader at Sandbanks. However, it got even colder at Churchill Lane and Vats and Tony reported that their sheets were frozen stiff as boards when they wrapped them up at dawn. At Rimac, Glen Summers found ice had formed on his cables as he wound them in. Despite these conditions, Peter Clarke recorded two male Marsh Moth, one in each of his traps, but everyone else's traps were blank for this species. Peter's traps were not in exactly the same places as the previous night. One was 30 m from the trap at Site A which had captured four males. The other was 120 m south of the huge conical sandhill near the car park. Peter's trap-sites encompassed an area at

least as large as the occupied area in Sandbanks Meadow. Neither of the males were flighty at 07.45h when released back on site.

The most noteworthy of the other moths recorded on this night were a Lyme-grass *Photedes elymi* (Treit.) and a Sand Dart down on the beach at Churchill Lane (Tony Rouse). Fox moths, Grass Rivulet, Dog's-tooth and Small Clouded Brindle were seen by most of us and the White Colon was reported again. As an indication of the size of the light-trap catches, the leader recorded 31 macro-moths of 9 species in his standard Robinson trap on the north edge of the Sandbanks Sea Buckthorn clump and 70 individuals of 17 species in an identical trap on the south edge. The catches were much smaller than the previous night.

Paul Chapman saw a Barn Owl *Tyto alba* L. patrolling the dunes in the evening and a Fox *Vulpes vulpes* L. hunting out on the saltmarsh while being mobbed by a pair of Sky Larks *Alauda arvensis* L. and a Meadow-pipit *Anthus pratensis* (L.) in the morning. The Natterjack Toads were heard calling at Rimac during the night. The leader saw a Sparrowhawk *Accipiter nisus* (L.) fly past with a small bird in its talons after he had just enjoyed his own breakfast by the car. A Little Egret *Egretta garzetta* (L.) was also seen, one of five regularly present on the reserve, although the nearest nesting is at Holkham, Norfolk, where there are currently about 30 pairs (John Walker).

DISCUSSION

It is odd that no Marsh Moths were captured in the traditional spot at Sandbanks, where they had been recorded on the wing the previous week, yet they were flying at Rimac on both nights, some in quite fresh condition. John Walker reported an interesting observation when informed of this result. He recalled that the Natterjack Toads spawn at Sandbanks in advance of the spawning dates at Rimac, sometimes by up to a fortnight earlier. This is presumed to be due to some temperature or other microclimatic difference between the sites and this could be affecting the emergence of the Marsh Moth likewise. Rimac is more open and exposed than Sandbanks.

The results of this event are important in demonstrating that the Marsh Moth is not confined solely to the Sandbanks Meadow, but still occurs on the Rimac part of the reserve where it was first found by Bernard Skinner (pers. comm.) in the 1970s. The Rimac part of the reserve differs from Sandbanks Meadow in that it is not cut for hay. From a management point of view it is most helpful to know that the moth is not restricted to a single part of the reserve and has survived under two different management regimes. From a scientific point of view, the results open up a much larger area within which to study the ecology of the Marsh Moth and to compare and contrast different breeding situations.

ACKNOWLEDGEMENTS

The leader thanks all who attended, especially John Walker, Assistant Site Manager, English Nature, for his assistance in reconnoitring the nature reserve during the day and for much background information on the site management. He also thanks Adrian Wander for the use of his Garmin 12 Global Positioning System (GPS) on the first night to supply the ten figure grid references for the trap-sites in which the Marsh Moths were captured.

REFERENCES

- Pilcher, R.E.M., 1971. *Hydrillula palustris* Hubn. in Lincolnshire. *Entomologist's Record and Journal of Variation* 83: 23.

- Pilcher, R.E.M., 1973. *Hydrillula palustris* (Hubner) in Lincolnshire. *Entomologist's Record and Journal of Variation* **85**: 230–233.
- Waring, P., 1992. Slipping a disc in the grass. *British Butterfly Conservation Society News* **50**: 51–53.
- Waring, P., 1996. The 1994 Presidential Address—part 2: Field meetings—a celebration of some past glories and the present role of field meetings as an increasingly valuable part of our activities. *British Journal of Entomology and Natural History* **9**: 21–43.
- Waring, P., 2001. The Marsh Moth *Athetis pallustris* (Hbn.) in Lincolnshire. Research and Survey in 2001. Report to Butterfly Conservation & English Nature. 22 pp.
- Waring, P., 2003. Field meeting report—Gibraltar Point National Nature Reserve, Lincolnshire, 16 June 2001. *British Journal of Entomology and Natural History* **16**: 55–57.
- Waring, P., 2004a. News on the conservation of some UK Biodiversity Action Plan moths in 2003. *Entomologists' Record & Journal of Variation* **116**: 134–137.
- Waring, P., 2004b. Marsh Moth in decline—light-trappers needed. *Bulletin of the Amateur Entomologists' Society* **63**: 71–72.
- Waring, P., 2005a. Field meeting report—Red Farm Flash, North Somercotes, Lincolnshire, 31 May 2003. *British Journal of Entomology and Natural History* **17**: 196–198.
- Waring, P., 2005b. The Marsh Moth *Athetis pallustris* (Hbn.) in Lincolnshire: Research and survey in 2004. Butterfly Conservation Report No. S05-09. Wareham.

**National Insect Week, Indoor lecture, The Natural History Museum,
London, 17 June 2004**

Speaker: **Dr Paul Waring**.—As one of the many events held as part of the first “National Insect Week”, in June this year, the BENHS was invited to provide an indoor presentation introducing itself to the public in a lunch-time slot at the Darwin Centre in the Natural History Museum. Accordingly, Dr Paul Waring, Field Meetings Secretary and a past President of the Society, delivered a short lecture



Paul Waring showing a hawkmoth at a BENHS lecture during National Insect Week 2004.

covering the origin of the Society in 1872, the indoor meetings, workshops, annual exhibition, web-site, journal and books published by the Society and in particular the field meetings and expeditions organised for members. The lecture was illustrated by photographs taken on past field meetings and expeditions and by live hawk-moths, eggs, caterpillars and cocoons brought from home (Fig. 1). A Privet Hawk-moth *Sphinx ligustri* (L.) was introduced as the largest moth in Great Britain and quickly became a star attraction amongst the children. The live audience numbered about twenty people, only a few of whom were members of any entomological society but about a third of whom had either photographed or reared at least one insect. The presentation was filmed on a video-tape for on-line viewers within the museum. An edited version omitting the informal examination of the moths will be available for world-wide viewing via the museum website www.nhm.ac.uk.

Wood of Cree RSPB Nature Reserve near Newton Stewart, Kirkcudbrightshire, 18–20 June 2004

Leaders: **James Cadbury** and **Mark Telfer** (RSPB). This BENHS, Grey Daggers and RSPB joint meeting was attended by nine participants, focusing on Lepidoptera and Coleoptera, but aiming to increase knowledge of invertebrates in general at a reserve with rich potential but few records. Wood of Cree (NX 3772) is one of the largest remaining ancient broad leaved woodlands (163 ha) in southwest Scotland. However, much of it is fairly dense oak-wood with trees no more than about 80 years old following clear-felling in the early 1920s. Perhaps the most interesting habitat is 13 ha of herb-rich swamp-fen (with 50 species of vascular plants including 10 sedges) that borders the River Cree (NX 374720). Much of the fen is flooded in winter. MV light traps were run at five sites on the reserve and the fen was surveyed during the day.

The first night (before the official meeting) was distinctly cool, but there was plenty of moth (and midge) activity the following night (19/20 June) when the northerly wind dropped and the temperature rose. A total of 80 moth species (74 'macros') and five butterflies were identified. Among these were three Nationally Notable and ten Local species. The previous total for the reserve was only 55 species of moths.

Four-dotted Footman *Cybosia mesomella* (L.) (Local) was one of the most frequent moths (54 individuals recorded), not only at light but also at dusk in the wetter areas. Other abundant species were both White and Buff Ermine *Spilosoma lubricipeda* (L.) and *S. luteum* (Hufn.), Brown Rustic *Rusina ferruginea* (Esp.), Poplar Hawkmoth *Laotloe populi* (L.), the attractive Green Arches *Anaplectoides prasina* (D. & S.) and Chimney Sweeper *Odezia atrata* (L.) which abounded by day in the grassland. A visit to a flushed mire (NX 375726) in the late afternoon produced 20 Silver Hooks *Deltote uncula* (Clerk) (Local) and several Smoky Waves *Scopula ternata* (Schränk) (Local), but neither were still flying at dusk. The attractive burnished green *Glyphipterix thrasonella* (Scop.) was abundant in the fen in the afternoon. Considering that there was little heathland at all near the trap sites 14 male Clouded Buffs *Diacrisia sannio* (L.) (Local) were a pleasant surprise. The Coronet *Craniophora ligustri* (D. & S.) is local in Scotland but five specimens were trapped. Three of the most noteworthy moths were single individuals of the pyralid *Eudonia delunella* (Stainton) (Nb), Welsh Wave *Venusia cambrica* Curtis (Local), and Red-necked Footman *Atolmis rubricollis* (L.) (Local).

Among the larvae swept by day from the fen were those of the Argem and Sable *Rheumaptera hastata* (L.) (Nb) and Glaucous Shears *Papestra biren* (Goeze) (Local) from *Myrica gale* (Bog myrtle) and possibly Valerian Pug *Eupithecia valerianata*

(Hb.) (Nb). The larva of the Yellow Horned *Achlya flavicornis* (L.) was beaten from birch.

Small Pearl-bordered Fritillaries *Boloria selene* (D. & S.) were on the wing in small numbers and one Large Skipper *Ochlodes venata* (Bremer & Grey), which is near the northern limit of its British range, was seen.

Mark Telfer identified 63 species among the beetles that he collected at the Wood of Cree. Among 41 species from the fen he discovered five Nationally Scarce (Nb) wetland beetles. *Agabus uliginosus* (L.) (Dytiscidae) is a southern water-beetle recorded from only two 10-km squares in Scotland and this would be the first record for Kirkcudbrightshire. *Donacia crassipes* F. (Chrysomelidae) is associated with water-lilies while *D. thalassina* Germar feeds on club-rushes and sedges. *Plateumaris affinis* (Kunze) is another chrysomelid associated with sedges on the margins of lakes, ponds and ditches. *Pelenomus comari* (Herbst) is a weevil that feeds on Marsh Cinquefoil; it does not extend further north in Britain than south-west Scotland. These records demonstrate that the fen at Wood of Cree is a valuable habitat of at least regional importance. By contrast, the wood-pasture where 22 species were recorded yielded little of significance. This perhaps reflects the impacts of past management by coppicing and clear-felling.

Further invertebrate surveys at Wood of Cree, particularly the wetlands, would be worth undertaking at other times of year. Our thanks go to the site warden, Paul Collin for ensuring a rewarding trip.

Castor Hanglands NNR, Northamptonshire, 27 June 2004

Leader: **Paul Waring**.—On 27 June 2004 we celebrated the 50th anniversary of the declaration of Castor Hanglands as a National Nature Reserve with a BENHS day-time field meeting on site. This was part of a larger and very well attended event organised by English Nature which involved on-site marquees, side-shows and food-stalls. The leader brought along two Robinson light-traps full of live moths and gave a brief presentation on mothing and the BENHS to the party-goers in one of the tents at 13.00 h. As always, the live moths proved very popular with the children and the hawk-moths were admired by everyone. The main aim of the field part of the meeting however, was to see if we could detect the presence of the Orange-tailed Clearwing *Synanthedon andrenaeformis* (Lasp.) and the Yellow-legged Clearwing *Synanthedon vespiformis* (L.) on the site. The Yellow-legged Clearwing had not been confirmed from the site but a single pupal case suspected to be of this species was found by the site manager, Chris Gardiner, on 19 July 1996 and has been retained in his collection. The pupa was projecting from between the bark and the heartwood of a stump of a Pedunculate Oak *Quercus robur* L. felled two years previously, at the south end of the reserve. The Orange-tailed Clearwing was first recorded from the site by Rothschild some time prior to 1910 and an adult had been last seen here in 1996. The leader was joined by twelve members and others and, armed with his set of pheromone lures, a beating tray, nets and other equipment, we set off for the rough grassland and scrub in the centre of the site. This habitat is surrounded by some ancient broad-leaved woodland and larger conifer plantations. A large bush of Wayfaring-tree *Viburnum lantana* L. had been selected in advance and at 14.00 h a “vesp” lure was hung up on it, hoping to attract the Orange-tailed Clearwing, for which this is the main larval foodplant. Instead two Yellow-legged Clearwings were attracted to the lure, both arriving within five minutes and viewed by all of us. Both flew in from downwind, along the broad-leaved edge of woodland of which the Wayfaring-tree was part. This was at the other end of the reserve from where



Fig. 1. Castor Hanglands, 27 June 2004. Successful luring of Yellow-legged Clearwing. Photo: P. Waring.

the above pupa was found, suggesting the moth may be widely distributed within the wood.

I generally find that luring clearwings is most productive between noon and 15.00h and in warm, sunny, dry and calm conditions, so it is interesting to report that although this day was predominantly warm and sunny, a cloud was over us and there were actually a few spots of rain when the moths arrived. The first moth was boxed and passed around so that everyone could view it closely. The second settled on a Wayfaring leaf by the lure, then flew down to alight on the flowerhead of a grass, where it sat for some time as a dark cloud passed over. Then it approached the lure again. The accompanying photograph shows the group with the leader's right hand by the lure and his left hand passing round the boxed moth. The lure is in situ where it attracted the moths. I was both pleased, and relieved, that the technique had produced clearwings for the assembled people to see. Of the dozen persons in the group, only two had seen a clearwing moth previously, so for most it was a life-time first, befitting the historic nature of the occasion. No Orange-tailed Clearwings were seen however, but this does not mean they are not here. Further attempts will be made to find them.

Elsewhere in Northamptonshire the Orange-tailed Clearwing has only been recorded from nearby Bedford Purlieus (in 1962, the 1990s and most recently in 2000), with a much older record from Ashton Wold. The Yellow-legged Clearwing was found at nearby Bedford Purlieus in 1925. It was first found in Northamptonshire in 1882 and has since been reported also from Hazelborough Forest, Geddington Chase, Weekley Hall Wood and to pheromone lure at Thrapston (John Ward, County Macro-moth Recorder for Northamptonshire). Note that these records, together with distribution maps and notes on the status of the moths in Northamptonshire, can now be viewed on the web-site www.northamptonshirewildlife.co.uk/nmoths.

A little beating for larval Lepidoptera took place after the clearwing luring. This produced a final instar larva of the Common Quaker *Orthosia cerasi* (F.) from Hazel

Corylus avellana L. and single adults of the Short-cloaked moth *Nola cucullatella* (L.) from Common Hawthorn *Crataegus monogyna* Jacq. and the Green Oak Roller *Tortrix viridana* (L.) from Pedunculate Oak, respectively. A Burnet Companion moth *Euclidia glyphica* (L.) was flushed from the open grassland. Gavin Boyd recorded the following insects of other Orders: a female of the widespread and common yellow and black horsefly *Chrysops relictus* Meigen (Diptera: Tabanidae) which settled on one of our party and is associated with damp grassland, the widespread and frequent ground beetle *Pterostichus madidus* (F.) (Coleoptera: Carabidae) which ran across the track at the site entrance, the widespread grass-dependent capsid bug *Capsus ater* (L.) (Hemiptera: Miridae), swept from long grass and the more local cicadellid bug *Ledra aurita* (L.) beaten from Wild Privet *Ligustrum vulgare* L. but more usually associated with oaks which were growing above the privet.

A year old Common Toad *Bufo bufo* L., about the size of a large thumb-print, was found under a rotting log. The ponds on the site are well-known for numbers of breeding toads but in the spring of 2004 few were seen and there was little evidence of spawn (Mick Beeson, pers. comm.).

The leader thanks John Ward, and the web-site which he has compiled, for the background information on these moths in Northamptonshire. I thank all those who attended and English Nature for permission to hold this meeting. A copy of this report has been deposited with English Nature.

Askham Bog, Yorkshire, 30 June 2004

Leaders: **Roy Crossley & Harry Beaumont**—This was a joint meeting of the Yorkshire Naturalists' Union (Entomological Section) and the British Entomological & Natural History Society. The leaders and six other brave members gathered at this well known site in continuous rain. The intensity of the precipitation increased progressively, consequently little could be achieved. With unrealistic optimism several individuals ventured into the bog only to abandon the unequal struggle when themselves and their nets became waterlogged, a list of nine common moths and a few flies being the result. R.C. returned in the evening when the rain had lessened and managed to record 30 species of flies as part of an ongoing investigation of a recently cleared fen area. These included the syrphid *Platycheirus rosarum* (Fabr.) and the dolichopodid *Diaphorus oculus* (Fall.).

Barnham Cross Common, Norfolk/Suffolk, 1 July 2004

Leader: **Paul Waring**.—A good attendance of ten people turned up for this Thursday evening meeting at Barnham Cross Common near Thetford, on the Norfolk/Suffolk boundary. The main aim was to search for the Bordered Gothic moth *Heliophobus reticulata* (Goeze). The adult moth was recorded here as recently as the mid 1990s (Dudley, 2003) but we now know of no locality in the British Isles where it can be encountered reliably and it may have been lost since 2000 as a British resident. The larvae appear never to have been found within the British Isles on any foodplant (see Waring, 2002). The Barnham area has been searched by locally-based recorders on a number of occasions in favourable weather and on suitable dates in the last five years, including BENHS field meetings covering the RAF holdings (Tony Prichard, Co-County Moth Recorder for Suffolk) and this meeting was a last attempt to find the moth here. We covered a large part of the Common, from the car park on the northern edge by the A134 and playing fields on the outskirts of Thetford to the



Fig. 1. L–R: Peter Clarke, Rob Dyke, Tony Prichard and Andy Musgrove, Barnham Cross Common, 1 July 2004.

southern edge by the Barnham–Elveden road. Fifteen light-traps were operated and most were placed near flowering White Campion *Silene alba* and Bladder Campion *Silene vulgaris* which I believe to be the most likely larval foodplants in the area. We saw no Soapwort *Saponaria officinalis*, which is sometimes quoted as the foodplant and is still frequent in some parts of Breckland, such as around Hockwold and formerly at Maid's Cross Hill (Rob Dyke, pers. comm.). Steve Dudley (pers. comm.) lived at 46 Bracken Road (TL 867 819) until 1999 when he left the area. He captured Bordered Gothic on a number of occasions in the light-trap he operated in his garden. Unfortunately, he has lost his field notebooks from this era, so no longer has the exact dates and other details, but he is sure he encountered the moth up until about the year he left. On this field meeting I (PW) personally covered the part of the Common nearest to the houses on Bracken Road, operating two Robinson light-traps there until 02.00h and inspecting nectar plants by torchlight. These traps were removed after 02.00h only because of local warnings of potential vandalism and theft of equipment near the housing estate if traps were left unattended for a couple of hours while the owner was getting some sleep in his car. Tony Prichard (TP) operated his light-traps in the first major area of open grassland south of the playing fields and just south of mine. Rob Dyke and Andy Musgrove (AM) set up their traps on the east side of the A134, around the second parking area to the south, employing two 80W and one 125W Skinner traps and an actinic trap respectively. Peter Clarke operated two Skinner traps with 125W bulbs on the east side of the Common near the access point from Nunnery Drive. Lee Gregory and Allan Jenkins and his family covered the southern end of the Common on the west side of the A134, employing two 80W and three 125W Skinner traps, and a Skinner trap with a 11W actinic tube.

In several of the places banks have been created recently to act as barriers to stop motorists leaving the roads, car parks and tracks and parking on the Common. We found these banks particularly rich in flowering plants, including campions, bedstraws and mallows (see accompanying photo).

There had been rain showers in the area during the afternoon and we felt a few spots while we were selecting trap-sites. However, the clouds cleared and there was only 10% cloud cover as dusk fell. It was dark by 22.30h. The air was dead calm. A low, pale, full moon was soon visible above the horizon, though it was often obscured by low cloud. There was no further rain. By 23.00h we had recorded a number of Small Elephant Hawk-moths *Deilephila porcellus* (L.), a freshly emerged Pine Hawk-moth *Hyloicus pinastri* (L.) and an assortment of noctuid species. Moths continued to arrive steadily, in small numbers, until 00.30h, after which only a few species were added, such as the Poplar Grey *Acronicta megacephala* (D. & S.) and Small Angle Shades *Euplexia lucipara* (L.). By 01.30h there was very little activity and hardly any new arrivals at the traps so we began packing up. Most of the traps had been cleared away by 02.00h. Peter Clarke and Lee Gregory operated their combined total of five Skinner traps all night but after 02.00h the Burnished Brass *Diachrysia chrysitis* (L.) was the only new species added to the list for the night.

The catches of moths in the traps were not large. I counted 70–80 macro-moths in each of my standard pattern Robinson light-traps fitted with 125W MB/U mercury vapour bulbs. No Bordered Gothic were seen at any of the trap-sites. While the possibility that the moth survives at Barnham Cross Common cannot be ruled out, this negative result, added to those of all the other sessions since 2000, makes it increasingly unlikely. In mid-June 2004 Tony Prichard and others had two very good warm nights light-trapping in this area, recording over 100 species of moths on each occasion, but again no Bordered Gothic. Prior to the mid 1990s the moth was not difficult to trap here and could almost be expected to light (Steve Dudley and others, pers. comm.). Rob Dyke and Allan Jenkins both reported that in past years they had seen the Bordered Gothic at light before midnight, and sometimes soon after dark, at Maid's Cross Hill, Norfolk, and on the Isle of Portland, Dorset, respectively. I have never seen the Bordered Gothic in the UK, despite exploring both of these localities and others (see also Waring, 2004) but just after the meeting, from 7–11 July, I obtained a number of adults at light-traps operated during the first ever Field Congress of Societas Europaea Lepidopterologica (the European Lepidopterists' Society) in the Sesvenna district in South Tyrol, Italy. We found the Bordered Gothic frequent in the Sesvenna area, with most in fresh condition, and it came to light from soon after dark, both on various mountain-sides where we operated traps, and to a 6W actinic trap I set up on the balcony of my accommodation in the village of Burgeis. It was certainly not a difficult species to obtain where there was a sizeable population.

The most noteworthy of the macro-moths we recorded on the field meeting at Barnham Cross Common included a somewhat worn male Clouded Buff *Diacrisia sannio* (L.) at the north end (PW); Fox Moth *Macrothylacia rubi* (L.), Grass Emerald *Pseudoterpna pruinata* (Hufn.), Lesser Cream Wave *Scopula immutata* (L.), Small Scallop *Idaea emarginata* (L.), Sharp-angled Carpet *Euphyia unangulata* (Haw.), Marbled Brown *Drymonia dodonaea* (D. & S.) & Archer's Dart *Agrotis vestigialis* (Hufn.) (AM); Plain Wave *Idaea straminata* (Bork.), Lime Hawk *Mimas tiliae* (L.) (late date), Reddish Light Arches *Apamea sublustris* (Esp.) and Bird's Wing *Dypterygia scabriuscula* (L.) (TP).

The full list of the species we recorded has been supplied to Andy Musgrove of the British Trust for Ornithology (BTO) who is co-ordinating the marshalling of biological data about the site, the Norfolk Moth Survey and Tony Prichard, County

Moth Recorder for Suffolk. Biological information about the site is especially important at present in view of current proposals to build a new road in the area.

REFERENCES

- Dudley, S., 2003. Bordered Gothic *Heliophobus reticulata*. *Atropos* 20: 59.
 Waring, P., 2002. Bordered Gothic *Heliophobus reticulata*. *Atropos* 16: 76–77.
 Waring, P., 2004. Searches for the Bordered Gothic *Heliophobus reticulata* around Peterborough, 2001–2003. *Entomologists' Record & Journal of Variation* 116: 131–133.

First Societas Europaea Lepidopterologica Field Congress, Sesvenna, South Tyrol, Italy, 6–11 July 2004.

Paul Waring (PW) & Rachel Thomas.—This event was the first ever Field Congress of the European Lepidopterists' Society. The aim was to bring together members of the society who are active fieldworkers and provide opportunities for them to record the moths and butterflies of an area for which the data would be appreciated, such as in special conservation areas, or localities which are under threat. The event was held in response to many requests from SEL members for more opportunities for fieldwork than are usually provided by the well-established biennial, primarily indoor Congresses which have been held by SEL since the 1970s. This Field Congress was included in the BENHS Field Meetings Programme for 2004 to alert members to an opportunity to conduct fieldwork in mainland Europe. Forty seven SEL members registered including Keith Bland and Mark Shaw from the UK.

The location chosen for the Congress was the Sesvenna region of South Tyrol in northern Italy, an area known to be rich in Lepidoptera. The event was well-organised by Sylvia Mader and Gerhard Tarmann, with invaluable assistance from Stefan Heim. Sylvia arranged all the local accommodation and handled the advance liaison with delegates. Before we set off from Britain we knew that Sylvia had organised lodgings for us on the outskirts of the village with opportunities to run a light-trap from our balcony. The Sesvenna is a mountainous region, within the Alps, in which the higher slopes are seasonally grazed by cattle or cut for hay and the lower slopes and valleys are either cultivated for crops and orchards or maintained as pasture or woodland. Some parts are farmed using somewhat traditional, low intensity methods, but increasingly intensive agricultural systems are being adopted, particularly over most of the lower altitudes. This was explained in a series of indoor lectures as part of the Congress. During these lectures the changes to the flora and fauna were described and the locations of the less altered habitats and their characteristic species identified. Hermann Mantinger from the Research Centre for Agriculture and Forestry, Laimburg, South Tyrol, lectured on "Development of agriculture in the Venosta Valley", Thomas Wilhalm of Naturmuseum Sudtirol, Bolzano, covered "The Flora of the Sesvenna region", and Peter Huemer and Gerhard Tarmann, from Tiroler Landesmuseum Ferdinandeum, Innsbruck, presented heavily illustrated lectures on "The Butterflies of South Tyrol" and "A Bio-database for the SEL Study Area Sesvenna". The database which Gerhard and others have developed already contains an impressive amount of data, which Gerhard was able to demonstrate using overhead displays and distribution maps from his computer. These lectures were most helpful in providing a background and context for our fieldwork, of which our records of larvae and nocturnal Lepidoptera were probably our most valuable contribution to the database. With so many pairs

of trained eyes on the day-time excursions, a good number of larvae were found. By night we operated light-traps in groups in remote places and/or by our lodgings.

On our arrival in Burgeis, Gerhard Tarmann informed us that the moth season in the Tyrol was running late this year: for example, few sphingids had been seen and only the Hummingbird Hawk-moth *Macroglossum stellatarum* (L.) was in any numbers.

Some delegates ventured out with light-traps on the evening of 7 July, but as we needed to settle our daughter Kirsty in on her first night, we both stayed in the apartment. PW contented himself with running the 'Waring Tropical' actinic light-trap on the balcony although it was difficult to contain the urge to head off into the mountains on what proved to be a good night weather-wise. The following morning there were just over one hundred moths in the trap, of about 25 species. Amongst these the Bordered Gothic *Heliophobus reticulata* (Goeze) and the rather similar *H. kitti* (Schw.) were among the more numerous moths. This was a fantastic and unexpected result. Some readers will be aware of PW's special interest and recent efforts to investigate the status of the Bordered Gothic in Britain, in view of its current decline to virtual extinction, and his keenness to obtain livestock and study the habits of the larvae (see Waring, 2004a). On each night of the Congress several others captured the species at light and eggs and egg-laying females were brought back to the UK, from which larvae were subsequently reared to pupation (see Waring, 2004b). This Congress was invaluable in demonstrating a habitat and climate regime in which the Bordered Gothic was widespread and numerous, in the apparent absence of Soapwort *Saponaria officinalis* L. (Caryophyllaceae), the supposed main larval foodplant in Britain. What was noted during the field excursions was that other members of the Caryophyllaceae were frequent in some areas, particularly Bladder Campion *Silene vulgaris* Garcke, Red Campion *S. dioica* (L.) and pinks *Dianthus* spp. Rearing the larvae showed that they were able to grow from egg to fully-fed final instar larvae on Soapwort but that they would accept campions. In both cases the developing seed-heads were strongly preferred over the foliage.

Another feature of the Congress was a daily "Roundtable" in which members brought specimens for identification or confirmation to experts in the group. This was invaluable to PW who was seeing some of the European species for the first time. For example, it was a pleasure to be able to have the diagnostic features and differences between *H. reticulata* and *H. kitti* explained by Lazlo Ronkay, the internationally respected noctuid specialist and one of the authors of the Noctuidae Europaeae series (Fibiger *et al.*). Lazlo was able to demonstrate diagnostic features with reference to live individuals and to tell us what is known of the larval habits of these and other moths in mainland Europe.

In addition to *H. reticulata* and *H. kitti*, the light-trap catch on the first night comprised lots of familiar species including the Heart & Dart, *Agrotis exclamatoris* (L.), Dark Swordgrass *Agrotis ipsilon* (Hufn.), Large Yellow Underwing *Noctua pronuba* (L.), Broad-bordered Yellow Underwing *Noctua fimbriata* (Schröb.), the Light Arches *Apamea lithoxyloa* (D. & S.), Clouded-bordered Brindle *A. crenata* (Hufn.), Brown Rustic *Rusina ferruginea* (Esp.), a Small Yellow Underwing *Panemeria tenebrata* (Scop.) and many Silver Y *Autographa gamma* (L.). Noctuids not present in Britain included *Achnis detersa* (Esp.) a moth with the appearance of a robust shoulderknot (*Lithphane* spp.) and *Lacanobia aliena* (Hbn.). There were rather few geometrids, possibly because the trap was operating at balcony height rather than nearer the ground. Geometers included the Silver-ground Carpet *Xanthorhoe montanata* (D. & S.) and Tawny-barred Angle *Macaria liturata*



Fig. 1. Paul Waring and daughter Kirsty, near Taufers, 8 July 2004.

(Clerck). The Larch Pug *Eupithecia lariciata* (Frey.) was the only geometrid represented by more than one or two individuals. Members of other families included the Pine Hawk-moth *Hyloicus pinastri* (L.) and Red-necked Footman *Atolmis rubricollis* (L.).

Castle Furstenburg in Burgeis was our base for all the indoor lectures and the Roundtables. It was here on the morning of 8 July that we gathered for the first of our two major excursions. This was a guided walk from the ruins of the castle Schloss Rotund near Taufers to the village of Schleis along the historically significant and panoramic Eselsweg trail. This took approximately 5 hours, and involved trekking through some of the most attractive and wildlife-rich mountain scenery in the Alps, with various semi-natural habitats, particularly dry, grassy, herb-rich and rocky steppe, scrubby areas and larch woodland. Kirsty was safely transported in a carrier on PW's back as we crossed some very steep slopes with considerable drops below. The route is an ancient track for mules and donkeys and was used as a shortcut to carry goods from the Mustair valley in Switzerland to the Reschenpass which has been part of both Austria and Italy at different times. The trail became famous in 1499 when it was used by Swiss soldiers to avoid and then corner and slaughter the massed troops of the Austrian emperor Maximilian I.

The most memorable sight was seeing several dozen Nine-spotted moths *Amata phegea* (L.) during the walk. It is considered very local in Europe although sometimes, as here, it is numerous where it occurs. The larva feeds on a range of small plants, usually in the early stages of plant colonisation of broken or disturbed ground, such as slippages, or the margins of fields in low-intensity agricultural systems, particularly fallow fields. There were lots of plants in flower where we saw these moths, including thyme, Common Bird's-foot Trefoil, bedstraws and mulleins

and the moths were visiting some for nectar at noon and throughout the afternoon. Other individuals were resting on grass-stems and several pairs were seen in copulation. This species is very obvious and makes no attempt to conceal itself. It flies slowly and was easy to net. The white tips of the antennae were very striking in flight, rather like those of some sawflies and ichneumonid wasps. Several adults of the Transparent Burnet moth *Zygaena purpuralis* (Brnn.) were seen on the mauve flowers of a legume. These burnets were identified by Gerhard Tarmann, who assured us they were not the very similar *Z. minos* (D. & S.), a very much more localised species in the Tyrol.

Butterflies seen on the first stage of the trek included several Woodland Ringlet *Erebia medusa* (D. & S.) on the wing and a Northern Wall Brown *Lasiommata petropolitana* (Fab.) settled on the bark of a tree trunk. Several of the Chimney-sweeper moth *Odezia atrata* (L.) were also noted on the wing. Some larvae of the Striped Lychnis *Shargacucullia lychnitis* (Ramb.) were found on a small mullein. A number of the burnet moth *Z. transalpina* (Esp.) (det. Tarmann) were encountered on the flowers of Field Scabious *Knautia arvensis* (L.). The Slender Scotch Burnet *Zygaena loti* (D. & S.) was also recorded. An Apollo butterfly *Parnassius apollo* (L.) was found resting on Dogwood *Cornus sanguinea* L. A number of spiny larvae of the Spotted Fritillary *Melitaea didyma* (Esp.) were found by the path, possibly attempting to bask. An adult Knapweed Fritillary *Melitaea phoebe* (D. & S.) was found at rest in the same location. A Forester moth *Adscita* sp. was netted by one of the delegates who knew that it could be one of about nine possible species. Several more *Z. purpuralis* were seen more than 1 km from the first ones, flying in the same place as an Adonis Blue *Lysandra bellargus* (Rott.) and a Grizzled Skipper *Pyrgus malvae* (L.).

We next encountered some Sessile Oak *Q. petraea* (Matt.): these individuals are reputedly the highest oak trees growing in the Alps, at an altitude of about 1600 m. There were also clumps of European Larch *Larix decidua* Mill. which have been shown by core samples to be over 1000 years old. Several Speckled Yellow *Pseudopanthera macularia* (L.) were on the wing in this biotope, which looked very different to the more open meadows at the start of the trek. A larva of the Toadflax Brocade *Calophasia lunula* (Hufn.) was found on its food plant and PW noted a Bright Wave *Idaea ochrata* (Scop.) in the same place. A Grayling butterfly *Hipparchia semele* (L.), was flitting around the rocks by a mountain stream where a pink-flowered *Lychnis* was being visited for nectar by a Knapweed Fritillary. A second Apollo was found here. This species is of course protected by law and was left on site, as indeed were the majority of the insects recorded on the trek.

After lunch we were hill-walking with more forest and green fields below and clearly leaving the steppe areas which were the most interesting places for the Lepidoptera. A Dingy Skipper *Erynnis tages* (L.) was encountered. We came across a whole area of hillside covered in a multi-stemmed form of *Verbascum* which otherwise looked like the Dark Mullein *V. nigrum* L., with deep yellow petals and a purplish red centre to the flower. At some point Mark Shaw found a larva of the Orange-tip butterfly *Anthocharis cardamines* (L.) feeding on a plant later identified by Thomas Wilhalm as Tower Mustard *Arabis glabra* L.

The walk ended in heavy rain. The evening meal was taken at a local hotel and consisted of traditional South Tyrolean dishes and wine accompanied by Stefan playing local folk music on a harp. Professor Niels Kristensen gave a brief and amusing Presidential Address. After the meal the rain was teeming down so none of us went out with light-traps, however, the "Waring Tropical" was switched-on on the balcony of our apartment.

The morning of 9 July was beautifully calm with a clear blue sky. The night's catch consisted largely of the same species as the previous night, but fewer in number, totalling about fifty individuals. Additional species included the Dark Arches *Apamea monoglypha* (Hufn.), Pale Mottled Willow *Paradrina clavipalpis* (Scop.), Bright-line Brown-eye *Lacanobia oleracea* (L.), Setaceous Hebrew Character *Xestia c-nigrum* (L.) and a Scarce Footman *Eilema complana* (L.).

After lunch we travelled with Rolf Mörter in his car up to the hay meadows high in the mountains just below snow-covered peaks near Taufers. Rachel walked about with a net to intercept a few of the Lepidoptera. Several Lewes Wave *Scopula immorata* (L.) were found in a shallow open valley with a waterfall. The flowering herb-rich alpine meadows were an attractive sight to see but unfortunately the weather was windy and overcast and it began to spot with rain soon after we arrived. Some lycaenids were seen including the Small Blue *Cupido minimus* (Fuess.). Other moths we saw included the Latticed Heath *Chiasmia clathrata* (L.), Chimney Sweeper and Silver-ground Carpet. Rolf showed us some strange-looking sooty pyralid moths of the genus *Metaxmeste* which he had collected in his more extensive wanderings in this area, as well as the Almond-eyed Ringlet *Erebia alberganus* (Prunner), the Alpine Heath *Coenonympha gardetta* (Prunner) and more *Z. purpuralis*. On his setting boards in the car he had specimens of the tiger moth *Rhyparia purpurata* (L.) from dry, lower montane habitat and a selection mainly of larger noctuid moths from higher altitudes including the Scarce Arches *Apamea lateritia*, *Apamea maillardi* (Geyer), *A. zeta* (Treit.), Reddish Light Arches *A. sublustris* (Esp.), Dark Brocade *Blepharita adusta* (Esp.), Ashworth's Rustic *Xestia ashworthii* (Dobl.), the Shark *Cucullia umbratica* (L.) and *Cucullia lusifuga* (D. & S.). Other moths Rolf had obtained at the higher altitudes included a Dark Bordered Beauty *Epione vespertaria* (L.) at 1100 m and some Speckled Footman *Coscinia cribraria* (L.) and the green form of the Barred Red *Hylaea fasciaria* (L.) from 1300 m above sea level.

From the high mountain meadows we descended to the outskirts of Taufers, where a barbecue was being organised for us. While the food was being prepared we set up light-traps, but our mothing session here was not to be. Rain soon began and became so heavy that the sheets and lights were literally rained off. Fortunately there were shelters purpose-built for eating at the barbecue where we consumed chicken, sausages and pollenta (a type of cornbread from maize) and had a most entertaining time.

Amazingly, the rain continued all night and it was still falling when we awoke well after dawn the next morning (10 July). The catch in our balcony trap comprised thirty species of macro-moth but the only new addition was a Peppered moth *Biston betularia* (L.) of the typical white form. As the morning was time-tabled for the lectures and an identification workshop, followed by lunch, the weather had time to clear up. There was a cultural trip including a lakeside welcome by local dignitaries and a visit to the Museum of the village of Graun. Later, quite a number of us went up to the mountain slopes above Taufers, for a recording session. PW spent a large part of the time with Axel Steiner's group, sitting around his mercury vapour bulb and actinic black-light tube operating in tandem, suspended above a vertical sheet and powered by a generator. Axel was not the only one operating this type of trap and the operators considered that more species were obtained as a result. Others were using actinic lights from batteries but generally larger tubes than the 6 W frequently used in the UK and USA.

A female *H. kitti* arrived at Axel's lights soon after dark and was retained for eggs. Shortly afterwards she was followed by a male Bordered Gothic. *Ochropleura (Albocosta) musiva* (Hbn.) was the next interesting moth to arrive, at 22.30h. This

species is associated with hot dry slopes. It is twice the size of the familiar Flame Shoulder *O. plecta* (L.) with a very striking and distinctive leading edge to the forewing. A male Essex Emerald *Thetidia smaragdaria* (F.) arrived a few minutes later. Axel remarked that he sees them in ones and twos per night in various parts of Germany he has worked in recent years. PW noted that a golden central spot and pair of cross-lines were present on the forewings of this individual but that these markings were weaker than in the normal British form, with which this was similar in size. In some parts of Europe individuals are distinctly smaller with obscure markings. After another few minutes the Feathered Ear *Pachetra sagittigera* (Hufn.), *Lacanobia aliena*, *Agrotis simplonia* (Geyer), *Lygephila viciae* (Hbn.) and the Dew Moth *Setina irrorella* (L.) arrived in quick succession. The Feathered Ear can vary greatly in wing markings, even within a single site, as it is known to do at this locality. This individual was strongly variegated on the forewings. Others can be uniformly pale or dark. The moth was last seen in Britain in 1963 but formerly had breeding populations in south-east England (Waring *et al.*, 2003). Its sward preferences in the UK are poorly documented but the decline and disappearance coincides with the decrease in rabbit-grazing brought about by the introduction of myxomatosis in the 1950s. The sparsely vegetated slopes at Taufers can be very hot, parched places in the summer and the Feathered Ear has been recorded here in some numbers. *Agrotis simplonia* is generally known as a xerophilic alpine species which has been recorded up to 3000 m above sea level in the Alps. It is named after the Simplon Pass in Switzerland.

Manfred Strohle had a most interesting set-up involving two triangular vertical sheets at different orientations, a mv bulb and black mv bulb in tandem and a string of about a dozen pheromone lures tied like sausages along the length of a lady's stocking. He did not appear to be obtaining noticeably more moths than Axel Steiner but he was in a location with more trees and shrubs. Additional species included a slightly worn Cream-spot Tiger *Arctia villica* (L.), Mottled Beauty *Alcis repandata* (L.), Barred Yellow *Cydia fulvata* (Forst.), Swallow-tailed Moth *Ourapteryx sambucaria* (L.), Large Emerald *Geometra papilionaria* (L.), Scalloped Hazel *Odontopera bidentata* (Clerck), Netted Pug *Eupithecia venosata* (F.) and a *Euphyia frustata* (Treit.).

On 11 July we were ready to return home, having added only Grey Pine Carpet *Thera obeliscata* (Hbn.) and Clay *Mythimna ferrago* (Fab.) to the list from the balcony trap during the night. Over the four nights this small trap had recorded about forty species of macro-moths, which was a small fraction of the species recorded in our exploration of the region. The balcony trap was evidently picking up mainly species closely associated with altered habitats in the village; many of these are also numerous in gardens in Britain. From the numbers of Bordered Gothic seen, this species must have been breeding around the village, as well as in the semi-natural habitats higher up the mountainsides.

We would like to thank all those named above for their help and company which made this 1st SEL Field Congress a great success. In particular, we thank Sylvia Mader, Stefan Heim and Gerhard Tarmann for all their organisational work before, during and after the event. Forthcoming meetings of the society may be found on the SEL website at www.socourle.org.

REFERENCES

- Fry, R. & Waring, P., 2001. *A guide to moth traps and their use*. Amateur Entomologist 24. Amateur Entomologists' Society. London.

Waring, P., Townsend, M. & Lewington, R., 2003. *Field guide to the moths of Great Britain and Ireland*. British Wildlife. Rotherwick. 432 pp.

Waring, P., 2004a. Searches for the Bordered Gothic *Heliophobus reticulata* around Peterborough, 2001–2003. *Entomologists' Record & Journal of Variation* **116**: 131–133.

Waring, P., 2004b. Wildlife reports—Moths. *British Wildlife* **16**: 58–60.

Hittisleigh Woods, Devon, 10 July 2004

Leader: **Roy McCormick**—Another unsettled day preceded this meeting with the sky looking decidedly ominous as evening approached, but it still did not prevent nine people from attending an evening that turned out better than expected. We had all assembled at John Milverton's house and because there is limited parking space in the wood, we transferred people who did not have equipment into other vehicles. John led the way for the two mile journey to Hittisleigh Wood, a woodland owned by him. Two of us had equipment and six traps were put out along the available tracks; the night stayed dry with a moderate cloud cover which cleared later, but this did not affect the temperature which stayed at 12°C. As the weather of the last month had been very wet, wellies were essential although the vegetation was dry and moths started flying to our lights as soon as we started them going. A bit of dusk brought in very little, but the list of moths to our lights increased steadily and by 23.30h we had recorded 64 species; four of our party decided to leave at this point having had a very enjoyable evening seeing species they had never seen before.

The traps were visited a couple more times before we decided that things were quietening down and it was time to pack up. We finished up with 93 species and one micromoth still to be identified, with the best of these: one *Olindia schumacherana* (F.); six *Eudonia delunella* Stt.; one *Phylctaenia stachydalis* (Germ.); four *Amblyptilia punctydactyla* (Haw.); 2 *Euphyia biangulata* (Haw.) (Cloaked Carpet); one *Pasiphila debiliata* (Hb.) (Bilberry Pug); six *Deileptenia ribeata* (Cl.) (Satin Beauty) and four *Brachylomia viminalis* (F.) (Minor Shoulder-knot). Another good night with better than anticipated results and a learning curve for some of the people who came, but low numbers of specimens seem to be the order of our times.

London Zoo, Regent's Park, London, 17 July 2004

Leader: **Paul Waring**.—The BENHS field meeting of 17 July was unusual in that it was held in the grounds of London Zoo at Regent's Park. The aim was to survey the native invertebrate wildlife living on and amongst the plants growing within and between the enclosures of exotic animals. There is actually a considerable amount of wildlife habitat on site. The habitats include: a newly established Woodland Walk area which is a belt of mature trees and shrubs on the bank of the Regent Canal which runs past the zoo; emergent and marginal vegetation by the canal; hedges and mature trees which separate the zoo from the rest of Regent's Park, which also has a broad range of mature trees; various recent plantings of exotic and native flora, including a wildlife garden; several ponds for exotic creatures such as flamingoes and pelicans. Such habitats are obviously at a premium in Central London.

The meeting was attended by thirteen people of which five were BENHS members and three were friends or relatives. Our hosts from the Zoological Society of London (ZSL), who run the zoo, were Kevin Frediani (Plant Curator), with his son Ben, and Paul Pearce-Kelly, Invertebrate Curator. At my invitation we were also joined by Rebecca Ellis and her daughter Mila. Rebecca is in the third year of a three year post-doctorate research project at Lancaster University, part of which is to study



Fig. 1. London Zoo, 17 July 2004. Discovery of larvae of Buttoned Snout on Golden Hop. Andrew Halstead, Rita and Ken Merrifield standing. Paul Waring, Len Winokur and Paul Pearce-Kelly kneeling. Photo: P. Waring.

volunteer wildlife recorders, so she was studying us studying the invertebrates! I was introduced to Rebecca at my presentation at the Natural History Museum on behalf of the BENHS during National Insect Week (*BJENH* 18: 136).

Our field meeting began at 14.30 h in warm, slightly overcast, humid weather, which rapidly improved to full sunshine for the rest of the afternoon and early evening. Calm weather continued throughout the night, with a dusk temperature of 20°C and a minimum for the night of 18°C. Most of us stayed all night within the zoo, serenaded by the peculiar sounds of the animal inhabitants. Rebecca stayed up until about 02.00 h with member Len Winokur and his colleague Alan Phillips who were manning two mercury vapour lights over sheets near the Regents Canal while being interviewed. The leader, his family (Rachel & Kirsty) and Mila operated two standard-pattern Robinson light-traps with 125 WMB/U bulbs all night from the mains supply at the "Bugs" building where we also got some sleep amongst the live invertebrate exhibits. In the morning we awoke to the rather harsh calls of toucans in the neighbouring enclosure! Kevin and Paul were on hand throughout our activities.

During the afternoon we beat, swept and netted insects, while explaining our modus operandi and objectives to Rebecca and to curious members of the public. One of the most interesting discoveries of this session occurred when the leader spotted and beat Golden Hop *Humulus lupulus* L. growing along a wooden fence by the wildlife garden. Almost immediately a green half-grown larva of the Buttoned Snout moth *Hypena rostralis* (L.) fell onto the beating tray and writhed and wriggled across it in characteristic fashion. This is a UK Biodiversity Action Plan Priority Species, the first such species ever to be recorded from the zoo. There are only two plants of hop in the grounds of the zoo and both had been present only for the last five to ten years, since planting (K. Frediani, pers. comm.). Both are of the golden variety and within a couple of metres of each other. While other members gathered

round to see the larva, Len and I beat several more and established that both the hop plants were occupied. The larvae were returned to the bushes after inspection, except for two, one of which was successfully reared to an adult by Len. The moth emerged from the pupa on 12 August and was subsequently exhibited at the annual exhibitions of the Amateur Entomologists' Society (AES) and BENHS in October and November 2004, respectively. The leader wondered whether there was any wild hop along the canal or elsewhere near the zoo, but none was seen during the meeting. The good news for the Buttoned Snout is that Kevin has obtained an additional twenty hop plants which are now ready to install. This is an example of how data and knowledge from BENHS meetings can be used to improve the conservation value of the site for native wildlife. The accompanying photograph shows some of the party with the larva on the beating tray and the occupied host-plants growing along the fence. A larva of the Comma butterfly *Polygonia c-album* (L.), 1cm in length, was also beaten from the hop and returned to it.

Other moth larvae beaten by the leader during the afternoon session included one of the Double-striped Pug *Gymnoscelis rufifasciata* (Haw.) from the flowers of a lime tree *Tilia* sp. and a larval Broken-barred Carpet *Electrophaes corylata* (Thunb.) on Common Hawthorn *Crataegus monogyna* Jacq., both in the Woodland Walk area. Butterflies seen in this area included a Holly Blue *Celastrina argiolus* (L.) nectaring at the flowers of a lime and a Speckled Wood *Pararge aegeria* (L.) flitting amongst the trees. Gatekeepers *Pyronia tithonus* (L.), Large White *Pieris brassicae* (L.) and a Comma were seen feeding at flowers of thistles *Cirsium* spp. which are deliberately being allowed to grow here, along with Common Nettle *Urtica dioica* L. and other plants often removed as weeds. Andrew Halstead and Ken & Rita Merrifield filled pooters and other vessels with Diptera and other insects from flowers. They hope to identify them over the winter. The scent of Wild Privet *Ligustrum vulgare* L. was heavy in the air. Flowering Marjoram *Origanum vulgare* L. in the wildlife garden on the other side of the zoo was being avidly visited by Green-veined Whites *Pieris napi* (L.), Gatekeepers and a Holly Blue. A Small White *Pieris rapae* (L.) was seen nectaring at Lavender *Lavandula* sp.

A female Latticed Heath moth *Chiasmia clathrata* (L.) was netted by Ken Merrifield. The various ponds appeared too eutrophic for much odonatan interest and we recorded no dragonflies or damselflies, but it was nearly 18.00h and the zoo visitors were leaving by the time the ponds were inspected.

For the nocturnal session one of the Robinson traps was operated by the open paddock occupied by the Rhea *Rhea americana*. This supported an almost breckland-like sward including Bird's-foot Trefoil *Lotus corniculatus* L. Len had inspected an adjacent caged area unsuccessfully for burnet moths and Six-belted Clearwing *Bembecia ichneumoniformis* (D. & S.) in the afternoon, causing some puzzled interest as he wielded his net within the cage like some unusual exhibit. The other trap was on the wooded edge of the zoo under trees of plane, poplars, ash and Turkey oak, with ground vegetation consisting of common nettle, Elder, Giant hogweed, Jack-by-the-Hedge and Broad-leaved dock. The traps caught respectively 39 macro-moths of 16 species and 97 macros of 17 species, providing a combined list of 24 species. The most noteworthy of the captures was the Least Carpet *Idaea rusticata* (D. & S.), which came to all four lights, with the highest total being five individuals at the trap by the Rhea paddock, and a single male Brown-tail *Euproctis chrysorrhoea* (L.) in good condition. Both species are south-eastern in Britain but well known, well-distributed and often frequent in the London area. Len and Alan added a single Slender Brindle *Apamea scolopacina* (Esp.) in good condition. This was a surprise because the moth is usually associated with grassy places in long-established woodland and is distinctly local in

distribution. The specimen was exhibited at the AES & BENHS exhibitions. It is a local species in the woodlands around London but is unusual in the inner, urban parts of the City (Plant, 1993). Most of the catch comprised almost ubiquitous species, the most numerous of which, in both traps, was the Heart & Dart *Agrotis exclamatoris* (L.). Species such as the Herald *Scoliopteryx libatrix* (L.), Brown Silver-line *Petrophora chlorosata* (Scop.) and Blood-vein *Timandra comae* (Schm.) provided the new-comers to moths with strikingly attractive examples to admire and photograph. Among the moth species Len and Alan added from down by the canal were the Blue-bordered Carpet *Plemyria rubiginata* (D. & S.) which is associated with Alder *Alnus glutinosa* (L.) and Blackthorn *Prunus spinosa* L., the common semi-aquatic pyralids Water Veneer *Acentria ephemerella* (D. & S.) and Ringed China-mark *Paraponyx stratiotata* (L.), and the European Corn-borer *Ostrinia nubilalis* (Hbn.), a rare immigrant until the 1930s but now well-established in London and the Thames Estuary, with other populations elsewhere (Goater, 1986). The presence of moths such as the Garden Elder Pearl *Phlyctaenia coronata* (Hufn.), Brimstone *Opisthograptis luteolata* (L.), Swallow-tailed Moth *Ourapteryx sambucaria* (L.), Scalloped Oak *Crocallis elinguaris* (L.), Poplar Grey *Acronicta megacephala* (D. & S.) and Herald attested to the value of the Elder *Sambucus nigra* L. and common hawthorn understorey that has been allowed to develop beneath the trees of the Woodland Walk, and the poplars *Populus* spp. and willows *Salix* spp. along the canal and elsewhere on the boundaries of the zoo.

The leader would like to thank all those who participated and made this unusual meeting so interesting, worthwhile and enjoyable, and Kevin Frediani and Paul Pearce-Kelly of the Zoological Society of London for their guidance and hospitality, which included accommodation plus tea and biscuits between sessions and a walk round the animal collections afterwards. A copy of this report and the field notes has been supplied to Kevin for the ZSL records.

REFERENCES

- Goater, B., 1986. *British pyralid moths—a guide to their identification*. Harley. Great Horkesley, Essex.
 Plant, C.W., 1993. *Larger moths of the London area*. London Natural History Society. London.

Quoditch Moor, Devon, 31 July 2004

Leader: **Roy McCormick**—This was the first organised meeting for 2004 that was not preceded by bad weather, but although the weather was fine, there was a full moon. A total of 18 attended. Four of us brought equipment and the two with four-wheel drive cars were able to drive a good way into the wooded part of the site where we laid out our traps, eight in all.

A couple of rounds of the traps were made with people gathering round each trap in turn to record the species and to improve their identification skills. The open parts of the site were being grazed by ponies, so the vegetation was a lot shorter here and this made walking through the area a lot easier. Species were coming in in small numbers and with the moon rising early with a clear sky the temperature dropped to around 6°C in the open parts and 12°C in the woodland. By around 23.00h we had recorded approximately 50–60 species with very little else coming in. A couple more rounds were made with the understanding that the second of these would be for individual trap owners to clear away their equipment. A final tally was taken after this task and we finished up with 94 species with a lot of these in single figures, the best being: one *Argyresthia brockeella* (Hübner); five *Eudonia delunella* (Stt.); one

Lampropteryx otregiata (Metcalf), (Devon Carpet); two *Epione repandaria* (Hufn.), (Bordered Beauty); one *Alcis jubata* (Thunb.), (Dotted Carpet); 15 *Xestia baja* (D.&S.) (Dotted Clay); one *Brachylomia viminalis* (F.), (Minor Shoulder-knot) and three *Apamea scolopacina* (Esp.), (Slender Brindle). A couple of the people had left before we finished packing up the traps, but they, along with all the people who attended, thoroughly enjoyed the evening. We left the site at around 01.00h with the owner, Richard Douglas-Green, very pleased with the digital pictures he had taken of species new to him.

Coppice Wood, Riseley, Bedfordshire, 12 August 2004

Leader: Paul Waring.—This all-night field meeting was held on a Thursday evening, with sleeping in cars overnight to enable the over-night operation of light-traps. The main aim was to search for the elm-dependent White-spotted Pinion moth *Cosmia diffinis* (L.), a UK Biodiversity Action Plan priority species (Waring *et al.*, 1999). This moth has declined greatly in distribution in Great Britain as a consequence of Dutch elm disease and is now only being reported from Huntingdonshire, Cambridgeshire, Essex and Bedfordshire (Waring *et al.*, 2003). Until 2002 the White-spotted Pinion had not been seen in Bedfordshire since 1985 when it was recorded in Coppice Wood near Riseley. On 2 August 2002 one adult was recorded by John Day (the younger of two John Days working for RSPB) in his garden light-trap at Potton, near Sandy, Bedfordshire. This was followed by a second adult at the same site in August 2003, indicating that the moth was in the county and possibly breeding nearby (Waring, 2004). Meanwhile, the former breeding site of Coppice Wood was inspected by day by the leader and John Comont, Bedfordshire County Ecologist, to see if it might be in a suitable condition



Figure 1. David Manning and Peter Clarke at Skinner trap on main ride through Coppice Wood, Riseley, 12 August 2004.

to support a resident population of the moth. The wood has not been explored for moths in recent years, partly due to difficulties in obtaining access permission and also due to restrictions owing to former military use (David Manning, personal communication). We found that the wood contained much elm, of more than one species, age-class and growth form. The edges of the rides (see Fig. 1), and some large blocks of the woodland, are full of elm regrowth dating from after the first ravages of Dutch elm disease in the 1970s. There are also some quite tall but not mature elm trees. Consequently, we made the arrangements for this field meeting which was attended by David Manning (County Micro-moth Recorder for Bedfordshire) who remembered visiting the site in the mid-1980s, Charles Baker (County Butterfly Recorder for Bedfordshire), Peter Clarke who drove down from Manchester, John Comont and the leader. Between us we had five mercury vapour light-traps and one actinic trap. Charles had brought one of the newly available but conventional designed light-traps with a netting base, as supplied by Worldwide Butterflies, fitted with a mercury vapour bulb (see Fig. 2). He also used a small actinic trap. Peter had two Skinner traps and the leader had two standard-pattern Robinson traps. David Manning collected micro-moths from all of these.

Once we had all arrived, we began by exploring the woodland tracks by car and selected sites for our five mercury vapour light-traps at the base of the tallest elms we could find. There was a large amount of lower elm regrowth at all the sites. Some of the elms had the small leaves of English Elm *Ulmus procera* Salis., other plants looked like Small-leaved Elm *U. minor* Miller and some had very large leaves reminiscent of Wych Elm *U. glabra* Hud. Quantities of Aspen *Populus tremula* L., Ash *Fraxinus excelsior* L. and oaks *Quercus* spp. were also noted. There had been heavy rain before dusk and there were puddles on the tracks but the night was free of rain. It was clear and calm as well as dry, shaded under the trees, with a dusk



Figure 2. Charles Baker using a new-style light-trap.

temperature of 17°C and a night minimum of 14°C. Rain did not start falling again until after we had inspected all the traps after dawn and were departing from the site.

In the morning the leader found 42 macro-moths of 17 species in the Robinson trap he had placed at TL041640 (Trap A) under elm trees near a gate on the main ride and 37 macro-moths of 16 species at his Robinson trap in a nearby side ride at TL041639 in the area known as Flints Wood (Trap B). Somewhat surprisingly, neither trap contained any exclusively elm-dependent species and the only *Cosmia* was a single male Dunbar *C. trapezina* (L.) in the first trap. Numbers of individuals were not counted at the other traps but Peter had 21 species of macros in his trap (C) on the main ride at TL037645 (shown in Fig.1) and 19 species in Trap D in a side-ride at TL037646. Charles had 14 species in his netting trap (E) by the main ride at TL038643 but very little in his actinic trap nearby. The only exclusively elm-dependent species we saw was a single Lesser-spotted Pinion *Cosmia affinis* (L.) in Trap D. The Dunbar was present in both of Peter's traps but not in Charles's. The most noteworthy of the other species recorded were two Bordered Beauty *Epione repandaria* (Hufn.) in Trap B, two Vine's Rustic *Hoplodrina ambigua* (D.&S.) in Trap B and at least one in Trap E, two or three Straw Dot *Rivula sericealis* (Scop.) in each of Traps A–D, a Dusky Sallow *Eremobia ochroleuca* (D.&S.) in Trap A and Maiden's Blush *Cyclophora punctaria* (L.), Phoenix *Eulithis prunata* (L.), Small Waved Umber *Horisma vitalbata* (D.&S.), Canary-shouldered Thorn *Ennomos alniaria* (L.), Black Arches *Lymantria monacha* (L.), Dingy Footman *Eilema griseola* (Hbn.) and Olive *Ipimorpha subtusa* (D.&S) in Trap C.

As shown above, numbers of macro-moths were not high on this night, probably because of the rain before dusk, and the Lesser-spotted Pinion was only detected by one trap. In these circumstances, a small population of the White-spotted Pinion could easily have been missed and additional light-trapping of this site to try and find it is recommended.

The catch of micro-moths was also rather small in numbers and predominantly common tortricids and pyralids, with virtually no gelechiids or smaller moths. Again, this was probably the result of adverse weather. David collected a selection of *Cnephasia* specimens for dissection, and all have since proved to be *C. genitalana* Pierce & Metcalfe. This species is not listed for Bedfordshire by Arnold *et al.* (1997). David reports that it has expanded its distribution in the last few years. It has now been recorded in Bedfordshire at eight sites, in eight different 10Km squares, between 1996 and 2004. Over 170 individuals have occurred in one trap, where it was absent until 1996.

A full list of the results has been supplied to Charles Baker for the files of the Bedfordshire Natural History Society and to John Comont for the files of Bedfordshire County Council. The leader thanks all those who attended and John for his liaison with a representative of the private owner, whom we all thank for allowing us to hold this meeting. The event was organised by the leader as part of Butterfly Conservation's Action for Threatened Moths Project with contributory funding from English Nature, to advance the UK Biodiversity Action Plan.

REFERENCES

- Arnold, V.W., Baker, C.R.B., Manning, D.V. & Woiwod, I.P., 1997. *The butterflies and moths of Bedfordshire*. Bedfordshire Natural History Society. Bedford.
- Waring, P., 2004. News on the conservation of some UK Biodiversity Action Plan moths in 2003. *Entomologists' Record & Journal of Variation*, **116**: 134–137.
- Waring, P., Townsend, M. & Lewington, R., 2003. *Field guide to the moths of Great Britain and Ireland*. British Wildlife. Rotherwick. 432pp.

Gutner Point, Hayling Island, Hampshire, 26 September 2004

Leader: **John Langmaid**.—Eleven members and guests attended this meeting in conjunction with the British Plant Gall Society on one of the few dry Sundays in the autumn of 2004. We met up in the car park of a local garden centre by kind permission of the owners. Recording at Gutner Point Nature Reserve, known as the richest saltmarsh in Hampshire for flora, was by kind permission of Mr David Ball, Senior Ranger, Hampshire County Council Countryside Service.

Records for the day included those made down the leafy lane leading to the Reserve. Fifteen species of plant-gall were found including two Red Data Book (RDB3) species: *Myopites eximius* Ségué and *Myopites inulaedyssentericae* Blot (Diptera: Tephritidae) and *Inula crithmoides*. A total of seven dipterous, one hymenopterous and two coleopterous leaf-mines were recorded and fifty species of Lepidoptera, the majority of which were of leaf-miners. A new vice-county record for south Hampshire (VC 11) was a mine of *Ectoedemia lousiella* (Sirc.) in a samara of *Acer campestre*. Other notable species were mines of *Phyllocnistis xenia* Hering (pRDB3), only found new to Hampshire in 2003, on *Populus alba* and *P. × canescens*, and, among seven species of Coleophoridae, cases of *Coleophora aestuariella* Bradley on *Suaeda maritima* and *C. adjunctella* Hodgk. on *Juncus gerardii* (both Notable B).

The day was enjoyed by all, and it was pleasing to have recorded no less than seventy-six insect species, three species of powdery mildew and two other fungi on plants.

SHORT COMMUNICATION

Record of Grizzled Skipper butterfly *Pyrgus malvae* (L.) on field meeting, greatly valued.—Members may be interested to hear that the sighting of the Grizzled Skipper butterfly *Pyrgus malvae* (L.) on the BENHS field meeting at Red Farm Flash, North Somercotes, Lincolnshire on 31 May 2003 has created considerable interest in Lincolnshire. Allan Binding, Butterfly Recorder for the Lincolnshire Branch of Butterfly Conservation contacted me following publication of the relevant field meeting report (*BJENH* 17: 196–198) to inform me that he has no records of this species from the Lincolnshire Coast (VC54) since 1965 when it was seen at Mablethorpe. All recent Lincolnshire records of the Grizzled Skipper have been from South West Lincolnshire (VC53) where it still remains at a few sites. The butterfly was seen by the leader of the field meeting and is an absolutely certain record. It is highly unlikely that this species would have been released by anyone, especially at such a remote location.

Records of the Grizzled Skipper, including four adults on 16 May 2004, from the transect route walked weekly by the author at Peterborough since 2000, are also greatly valued (Val Perrin, Butterfly Recorder for Butterfly Conservation, Cambridgeshire & Essex Branch). The butterfly appears to be thriving at this site, where it benefits from site management directed mainly at the nationally scarce Four-spotted moth *Tyta luctuosa* (D.&S.). A photograph of this site can be found in a recent issue of *Butterfly* (88: 18). Comparison with the photograph of Red Farm Flash in *BJENH* 16: 251–252 shows that the habitat at the two sites is similar in many ways. Both are completely open with light, calcareous soils and a predominantly short to medium-length, herb-rich sward.—PAUL WARING, 1366 Lincoln Road, Werrington, Peterborough PE4 6LS.

BENHS FIELD MEETINGS PROGRAMME 2005

- May 7 Whipsnade Wildlife Park, Bedfordshire. MV. Paul Waring.
- May 8 Syon Park, Middlesex. Edward Milner (c/o LNHS).
- May 8 Saltern Wood, IOW. David Biggs & Bill Shepard.
- May 14 Beacon Hill, Leics. Paul Waring.
- May 14 Chudleigh, Devon. MV. Roy McCormick.
- May 15 Thurlbear Quarrylands, Blackdown Hills, S. Somerset. Janet Boyd & Robin Williams.
- May 21 Seal Chart, nr Sevenoaks, Kent. John Badmin.
- May 22 Dunwich Heath SSSI, Suffolk coast. Stuart Warrington.
- May 25 Hatfield Moor, Yorks. MV. Bob Marsh.
- May 26 Saltfleetby-Theddlethorpe Dunes NNR, Lincs. MV. Paul Waring.
- May 30 Yeading Brook Fields & Islip Manor LNRs, Middlesex. Neil Anderson.
- June 5 Bedford-Purlicus NNR, Northants. Seán Karley.
- June 9 Godmersham Downs, Kent. Paul Waring.
- June 11 Aston Rowant NNR, Oxon. John Ismay & Barbara Schulten.
- June 12 Merryfield Airfield, near Ilminster, S. Somerset. Janet Boyd & Robin Williams.
- June 18 Tidcombe Fen, Devon. MV. Roy McCormick.
- June 19 Ashted Common, Surrey. Roger Booth & Libbie Worth.
- June 24–26 Scottish Entomologists' Meeting, based at Newton Stewart, Dumfries & Galloway. MV. Mark Telfer.
- June 25 Wolvercote Green & Somerford Mead, Oxon. MV. Paul Waring.
- June 25 Horsenden Hill, Middlesex. Rachel Terry & Andy Culshaw.
- June 25 Wimbledon Common, Surrey. Deborah Harvey.
- June 26 Chobham Common, Surrey. Paul Wheeler & Andy Wragg.
- June 28 Wye Valley woodlands, Gloucs & Monmouthshire. MV. Paul Waring.
- July 1 Noar Hill, nr Selbourne, N. Hants. Margaret Refern & Robin Williams.
- July 2 Porton Down, S. Wilts. Lena Ward.
- July 3 Esher Commons SSSI, Surrey. Brian Spooner, Keith Harris & Margaret Redfern.
- July 5 Wye Valley woodlands, Gloucs. & Monmouthshire. MV. Paul Waring.
- July 9 National Moth Day & Night.
- July 9–15 Dipterists Summer Field Meeting, Durham. Roger Morris.
- July 9 Wye Downs NNR, E. Kent. Eric Philp.
- July 10 St Margaret's at Cliffe, E. Kent. Eric Philp.
- July 16 Sheringham Park. nr Cromer. Norfolk. Stuart Warrington.
- July 16 Chudleigh, Devon. MV. Roy McCormick.
- July 23 Othmoor, nr Beckley, Oxon. MV. Paul Waring & Martin Townsend.
- July 23–30 The Glynhir Estate, Carm. BPGS & BSBI residential meeting. Richard Pryce.
- Aug. 4–8 Bettyhill & Invernaver, W. Sutherland. BPGS residential. Phil Entwistle.
- Aug. 13 Bridfrod and Dunsford Woods, Devon. MV. Roy McCormick & Paul Butter.
- Aug. 13 Far Ings SSSI NR, N. Lincs. Graeme Clayton.
- Aug. 14 Redgrave-and-Lopham Fen, E. Norfolk. Rex and Barbara Hancy.
- Aug. 20 Rainworth Heath SSSI, Notts. MV. Sheila Wright.
- Aug. 20 Elmley Marshes RSPB Reserve, Kent. MV. Mark Telfer & James Cadbury.
- Aug. 21 Billingham-Beck Valley LNR, Durham. Stephen Robbins & David Laing.
- Sep. 3 Wye Valley woodlands, Gloucs. & Monmouthshire. MV. Paul Waring.
- Sep. 3 Tandle-Hill Country-Park, Royton. S. Lancs. Norman and Alan Bamforth.
- Sep. 4 Cressbrook Dale, Derbyshire. Tom Higginbottom & Joan Egan.
- Sep. 11 Sherrardspark Wood. Herts. Chris Leach & Alan Draper.
- Oct. 1 Wyre Forest, Bewdley, Worcs. John Meiklejohn & Tony Simpson.
- Oct. 9 Browndown, S. Hants. David Biggs & John Langmaid.
- Oct. 15 Wisley, Surrey. Ian Sims & Andrew Halstead.
- Oct. 22 Saltern Wood, IOW. David Biggs & Bill Shepard.

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BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY



BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Published by the British Entomological and Natural History Society
and incorporating its Proceedings and Transactions

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British Journal of Entomology and Natural History is published by the British Entomological and Natural History Society, Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH, UK. Tel: 01189-321402. The Journal is distributed free to BENHS members.

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Typeset by Dobbie Typesetting Limited, Tavistock, Devon.

Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

Registered charity number: 213149

Meetings of the Society are held regularly in London, at the rooms of the Royal Entomological Society, 41 Queen's Gate, London SW7 and the well-known ANNUAL EXHIBITION is planned for Saturday 12 November 2005 at Imperial College, London SW7. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be obtained on application to the Secretary, J. Muggleton, at the address given below.

The Society maintains a library and invertebrate collections at its headquarters in Dinton Pastures, which are open to members on various advertised days each month, telephone 01189-321402 for the latest meeting news. The Society's web site is: <http://www.BENHS.org.uk>

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Orders for books and back numbers of the Journal and Proceedings to the Sales Secretary: G. Boyd, 91 Fullingdale Road, Northampton NN3 2PZ. Tel: 01604 410056.

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Cover photograph: *Diasemia accalis* (Walker), an adventive pyralid new to Britain, Gravesend, Kent, exhibited at the 2004 Society Annual Exhibition. Wingspan 16 mm. Photo: R. Jones.

NOTE: The Editor invites submission of photographs for black and white reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions can be in the form of colour or black and white prints or colour transparencies.

SOCIETY NEWS

**Dr Mark Telfer, BENHS President 2005–2006**

It was birds rather than insects which first captured my attention as a naturalist. Ironically, it was a former President of the BENHS and eminent lepidopterist who was instrumental in developing my interest in birds into a serious passion. I refer to Barry Goater who ran the Ornithological Society at Haberdashers' Aske's School for Boys, Elstree. Barry led minibus trips to many parts of Britain at all seasons, and took a 'rugged' approach to sleeping, eating and other comforts! These were great adventures in search of rare birds and I was hooked. From 1983 I started keeping a British list and travelled throughout Britain, from Shetland to Scilly in search of 'ticks'.

Of course, twitching is frowned upon by most serious naturalists but I have always had a broader interest in wildlife, starting with dragonflies on the school pond and branching out into other groups wherever I could get my hands on good identification literature: bumblebees, grasshoppers and crickets, butterflies, mosquitoes, moths, fungi and vascular plants.

I was discouraged from a biological career and so did not study Biology at A-level and went up to Cambridge to read Engineering. However, after the first year I changed courses to read Natural Sciences, concentrating on Ecology, with a mind to a career in conservation. During the summer of 1990 I led a conservation expedition to Nechisar National Park in Ethiopia during which we discovered the Nechisar Nightjar *Caprimulgus solala* (Safford *et al.*, 1995) new to science.

After university, I had the great good fortune to get a short-term post at the Biological Records Centre, Monks Wood, assisting Brian Eversham, who was then working as the Invertebrate Recording Schemes Co-ordinator. I was put to work on the atlas of British ground beetles (Carabidae). At the time, I was keen to develop a specialism as a naturalist and not to become a 'jack of all trades'. With Brian's help and encouragement, I began to try and get to know the British carabids and joined the BENHS.

After BRC, I moved to Norwich to study for a PhD at the University of East Anglia. My thesis was entitled "The life history of the grasshopper *Chorthippus brunneus*: geographical variation and climatic effects." I found considerable genetic variation between populations of grasshoppers and constructed a model which showed this variation to be adaptive to the sunniness of the local climate.

During my PhD I maintained a keen interest in carabids, concentrating on the fauna of Breckland. After leaving Norwich I worked for short periods carrying out entomological survey work firstly on Salisbury Plain and subsequently with the National Trust's Biological Survey Team in southern and eastern England. Then in 1998, I moved back to Monks Wood to fill Brian Eversham's shoes as Invertebrate Recording Schemes Co-ordinator. Soon after taking up my appointment, I also took over the role of Ground Beetle Recording Scheme organiser from Martin Luff.

I enjoyed nearly five years at BRC, at the hub of biological recording, seeing through the publication of several atlases and playing my part in several National Biodiversity Network projects and biodiversity research projects. During this period I also achieved an ambition: to find a beetle new to Britain (*Acupalpus maculatus* Schaum at Dungeness (Telfer, 2003)). But in 2003, yearning to spend more time in the field, I joined the Royal Society for the Protection of Birds, based at Sandy, Bedfordshire as the "Reserves Ecologist (non-avian biodiversity)". I cover the RSPB reserves across the UK, aiming for better conservation of biodiversity through better survey, monitoring and habitat management.

More recently, I have started working part-time as a freelance entomological consultant. In what spare time remains, I am working with John Walters towards a photographic identification guide to British carabid beetles.

I'm keen to broaden the appeal of entomology. The more people who understand and appreciate our invertebrates, the more people who will support their conservation.

ANNOUNCEMENTS

Changes to Subscription Rates

With effect from 1st January 2005 annual subscription rates will increase to the following: Ordinary and Corporate Members, £19.00, Junior and Concessionary Members, £6.00. Life Membership may be purchased after that date for £380.00.

I am conscious that this is a significant increase in percentage terms, but would emphasise that there has been no increase since January 2001 and it is our intention to hold the new rate for a similar length of time. Some societies opt to increase subscriptions annually in line with inflation, but we choose to have less frequent increases and keep disruption and administration to a minimum for ourselves and the membership.

The new subscription is no more than sufficient to cover increased costs over the period and we consider represents very good value for money even for those members who are not able to take full advantage of the Society's facilities and extensive programme of events, but only receive the Journal.

Honorary Treasurer, A. J. PICKLES,
2a Park Avenue, Lymington, Hants., SO41 9GX.

The Cribb Award

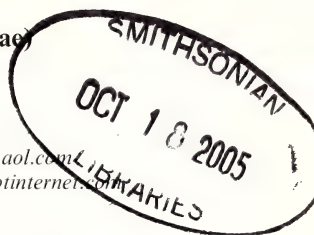
The Amateur Entomologists' Society invites nominations for the Cribb Award, which is available annually in recognition of outstanding contributions to invertebrate conservation. Details can be obtained from: Dr. D. Lonsdale, 33 Kings Road, Alton, Hants GU34 1PX (E-mail: d-lonsdale@supanet.com).

***Hypseloecus visci* (Puton) (Hemiptera: Miridae)
a mistletoe bug new to Britain**

DAVID GIBBS¹ AND BERNARD NAU²

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ABSTRACT

The first occurrence in Britain of the plant bug *Hypseloecus visci* (Miridae: Phylinae: Pilophorini) is reported, from two sites in Somerset in July 2003. The problems of identification using existing keys to British species are discussed. The species is described in detail and modifications to the keys in Southwood and Leston (1959) are presented which enable the species to be determined. The European range of this species is described and short notes on the biology are given.

INTRODUCTION

While surveying gardens and orchards in Somerset for the National Trust, one of us (DG) had the opportunity to sample mistletoe which was low enough to reach. As expected the mirid *Pinalitus viscicola* (Puton) was present at some sites but from two orchards an unfamiliar small black mirid was taken. Three specimens were found, a male and female at Tintinhull House (ST5019) on 22 July 2003 and one female at Barrington Court (ST3918) on 30 July. When DG tried to identify them using both Southwood & Leston (1959) and Nau (draft keys, unpublished manuscript) it proved impossible to reach a convincing determination, not even the subfamily could be determined. He then took the specimens to Dinton Pastures, to check against the British Entomological and Natural History Society collections and library, and took the opportunity to ask Roger Hawkins if he recognised the species. After consulting Stichel (1956) and Wagner and Weber (1964), the latter identified them as *Hypseloecus visci* (Puton) (Miridae: Phylinae: Pilophorini), a species and genus hitherto unrecorded in the British Isles. Subsequently, Bernard Nau confirmed this diagnosis by reference to Stichel (1956) and Wagner (1973).

IDENTIFICATION

The initial difficulty in identifying these specimens was in large part due to *H. visci* belonging to the tribe Pilophorini yet having a quite different appearance to the four existing British members of this tribe, all in genus *Pilophorus*. Our *Pilophorus* are very distinctive bugs which somewhat resemble wood ants. They have several silver bands across brown hemelytra, the side margins of the latter expand markedly behind the middle, and their average length is 4.0–5.0 mm. *Hypseloecus visci* (Fig. 1) has neither the silver bands nor the expanded hemelytra and is considerably smaller, the male length is given by Wagner (1973) as 3.2–3.5 mm and female 3.0–3.6 mm. By contrast, *H. visci* superficially resembles the mirids *Psallus perrisi* (Mulsant & Rey) and *Atractomus magnicornis* (Fallén) due to its blackish appearance, ovate form and small size, the length of the Somerset specimens being about 3.3 mm.

Closer inspection reveals that *H. visci* shares a very characteristic feature of *Pilophorus* spp., this is the form of the 'back' of the head. Viewed from the side this is strongly concave, arching over the pronotal collar and forming a sharp keel along the hind margin of the vertex. Also the head is short and wide, with protruding eyes



Fig.1. Male (left) and female (right—appendages omitted) of *Hypseloecus visci*, $\times 10$.

flattened posteriorly. In *H. visci*, males and females differ in form. Males are more elongate and the membrane is coplanar with the corium and cuneus. The female is more strongly ovate, the pronotum more transverse, and the membrane is angled sharply downwards. In both sexes the hemelytra have an incision directed inwards from the lateral margin at the base of the cuneus, appearing more developed in the male. Other details are as follows:

The upperside is uniformly brownish-black or black except the apex of the corium, which is narrowly whitish, and the base of the cuneus which has a rusty tinge; the apex of the scutellum may also be rufous. The membrane is dusky with whitish veins. The head has the apices of clypeus and paraclypeus white, and also the vertex along the inner border of the eye. The pubescence of the upper side takes two forms: adpressed gold scales which are quite densely distributed, and adpressed hairs which appear pale or dark, depending on the lighting. The antennae are brownish-yellow with segments A3 and A4, and the apex of A2 dusky; the base of A2 and A3 is narrowly white. The thickness of A2, at the middle, is less than or equal to that of A1. The legs are whitish-ochre, the femora with a dusky reddish wash; the tibiae have dark erect spines, longer or equal to the tibial thickness and set in large dark spots that have a tendency to form narrow bands. The tarsi have segment T3 about as long as T1 + T2, and T3 is dark. The tarsal claws are slender and become progressively convex apically. The form of the aedeagus (Fig. 2) is very similar to that of *Pilophorus* spp. but differs in basal and apical details; also its long slender form somewhat resembles that of *Atractotomus* spp., but in these there is no terminal 'spatula'.

This species does not fit comfortably in the keys in Southwood and Leston (1959) as the tribe Pilophorini has since been moved from sub-family Orthotylinae to sub-family Phylinae (Aukema & Rieger, 1999). Also, on entering the key within Orthotylinae it leads to tribe Halticini and then to genus *Strongylocoris*. The simplest solution is to add a couplet to the beginning of the key to sub-families (page 202) as follows:

0. Head strongly concave posteriorly in side view. [*Pilophorus* spp. have distinctive forewings: clearly expanded posteriorly, brown in colour with several conspicuous transverse bands of silver hairs.] Pilophorini (p. 242)
Not as above. 1

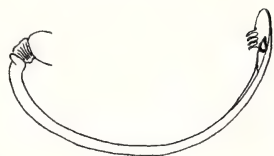


Figure 2. Aedeagus of *Hypseloecus visci* (based on Wagner, 1973).

Also, in the Orthotylinae key (page 242) the first couplet should be deleted and, on the lower half of the page, in the section headed 'Pilophorini' the following couplet should be inserted before the key to genus *Pilophorus*:

1. Forewings expanded posteriorly, brown in colour and bearing several transverse bands of silver hairs. $L > 3.75$ mm *Pilophorus*
 Forewings not expanded posteriorly, blackish, no silver bands. $L < 3.75$ mm *Hypseloecus visci*

BIOLOGY

Within continental Europe, the range of *H. visci* extends from The Netherlands and Germany, south to France and Italy, and east to Poland, the Ukraine and Turkey; two other species in the genus only occur further east (Aukema & Rieger, 1999). Ehanno (1987) maps the distribution in France, showing this species scattered throughout the country but with more records in the north, particularly Brittany. In The Netherlands there are only a handful of records from the extreme south-east, in Limburg (Aukema, 1998).

The three specimens found in Somerset in late July were shaken from mistletoe growing on apple trees in orchards, and mistletoe is the host in continental Europe too, Wagner (1973) states that the adults are found in July and August, and the eggs overwinter. It appears to be phytophagous (Wachmann *et al.*, 2004).

In 1889 J.W. Douglas (*Ent. Mon. Mag.*, 25: 256) reports that Dr A. Puton had, the previous year, described two species of Heteroptera 'taken on mistletoe in the environs of Paris'. He goes on to say that "These should be of special interest to British collectors, for it is not at all improbable that both may be found in England." The species were: *Orthops viscicola*, found in Hereford later the same year, and the present species, *H. visci*. He was correct but premature!

Subsequently, there have been records in 2004 as follows: Jonty Denton found *H. visci* on mistletoe in Bushy Park, Middlesex, in great numbers on 27 June; and Richard Dickson took several at mercury vapour light in his garden at Fareham, Hampshire on 2 August and 8 August.

ACKNOWLEDGEMENTS

David Gibbs is very grateful to Roger Hawkins for identifying the specimens. Also to Matthew Oates of the National Trust, who commissioned the work, and Floyd Summerhayes and Tanis Roberts of Tintinhull House and Christine Brain of Barrington Court for their hospitality during his visits. We also thank Jonty Denton for details of the Middlesex record.

REFERENCES

- Aukema, B. 1998. Vondsten van *Pinalitus viscidola* en *Hypseloecus visci* in Limburg (Heteroptera: Miridae). *Entomologische Berichten, Amsterdam* **58**: 244.
- Aukema, B., & Rieger, C. 1999. *Catalogue of the Heteroptera of the Palaearctic region* Volume 3, publ. by the Netherlands Entomological Society, Amsterdam.
- Ehanno, B. 1987. *Les Hétéroptères Mirides de France. Tome 2-B: Inventaire biogéographique et atlas*. Muséum National d'Histoire Naturelle, Paris.
- Nau, B.S., —. Hemiptera–Heteroptera. Key to Miridae. unpublished manuscript.
- Southwood, T.R.E. & Leston, D. 1959. *Land and water bugs of the British Isles*. Warne. London.
- Stichel, W. 1956. *Illustrierte Bestimmungstabellen der Wanzen. II. Europe. Volumen 2*. W. Stichel, Berlin.
- Wachmann, E., Melber A., & Deckert J. 2004. *Wanzen Band 2*. Die Tierwelt Deutschlands **75**, Goecke & Evers, Kelttern.
- Wagner, E. 1973. *Die Miridae Hahn, 1831, des Mittelmeerraumes und der Makaronesischen Inseln (Hemiptera–Heteroptera)*. Entomologische Abhandlungen Staatl. Mus. Tierkde. Dresden: Band 39 Suppl.
- Wagner, E. & Weber, H.H. 1964. *Hétéroptères Miridae*. Faune de France **67**, Fédération Française des Sociétés de Sciences Naturelles, Paris.

SHORT COMMUNICATION

***Lasius brunneus* (Latreille) (Hymenoptera: Formicidae) in Monmouthshire.** – Workers of the Nationally Scarce brown tree ant *Lasius brunneus* were found on an ancient oak tree within the former deer park of Llantilio Crossenny (SO412141), 12.vi.2005, during a visit by members of the Ancient Tree Forum (ATF). The species has only recently been detected in this part of Wales but this is a very under-recorded area and the ant may well have been present for some time. The earlier records have not been formally published. Peter Hammond noted its presence in Wyelands Park, Chepstow (ST522918), 13.viii.1994, during specialist survey of old parklands for the Countryside Council for Wales; A.P. Fowles subsequently found it to be widespread there, 7.vi.1999. P. Skidmore found it deeper into Wales in Clytha Park, west of Raglan (SO3608) during 2002, and A.O. Chater identified it from Dingestow Court Park (SO452097), 10.iv.2004. These sites appear consistent with the ant's known distribution through the lower Severn catchment (Alexander & Taylor, 1997) and all lie between the Rivers Wye and Usk. It is unclear whether the species is a long-overlooked resident or has undergone a recent range expansion westwards.

Thanks to David Parsons for suggesting the Ancient Tree Forum visit this gigantic tree, to Adrian Fowles for permission to refer to the unpublished CCW records, and to Glenda Orledge for details of the Dingestow record. – KEITH N. A. ALEXANDER, 59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ

REFERENCE

- Alexander, K.N.A. & Taylor, A. 1997. The Severn Vale, a national stronghold for *Lasius brunneus* (Latreille) (Hymenoptera: Formicidae). *British Journal of Entomology and Natural History* **10**: 217–219.

***HOMONOTUS SANGUINOLENTUS* (FAB.) (HYMENOPTERA: POMPILIDAE): SOME RECENT RECORDS AND OBSERVATIONS FROM THE NEW FOREST, HAMPSHIRE**

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E-mail: bryan.pinch@lineone.net

ABSTRACT

A number of recent records of the Red Data Book 1 spider-hunting wasp *Homonotus sanguinolentus* are reported. An observation of a female apparently searching for the host spider in the New Forest, Hampshire is also described.

INTRODUCTION

The spider-hunting wasp *Homonotus sanguinolentus* (Fabricius) has always been regarded as something of a rarity in Britain (Day, 1988; Falk, 1991). It is currently included on the Biodiversity Action Plan Priority list and is classified as Red Data Book 1 (Endangered) (Anon, 1995). It is known from a few records in southern England, largely centred on the New Forest, Hampshire and the Purbeck heathlands in Dorset.

The host spider has been identified as the clubionid *Cheiracanthium erraticum* Walkenaer (Edwards, 1997). One of the most recent New Forest records was of a single male captured on dry heathland by G.R. Else on the southern end of the Cranemoor valley mire complex (SU1902), on the western side of the New Forest near Burley in 1990. After this record, there appear to have been no more until a series of my own records since 1999.

RECENT NEW FOREST RECORDS

Here I outline these recent records gathered between 1999 and 2002, and an observation of a female apparently hunting for its host, during 2004.

On 4 August 1999 I was visiting Markway Inclosure and Duckhole Bog approximately 2 km west of Brockenhurst (SU2502) in the New Forest when I came across the web refuge of the spider *C. erraticum* clustered in the top of a dead purple-moor grass *Molinia caerulea* seed head. Out of curiosity, I opened the web to discover an off-white coloured cocoon and a few remains of the original arachnid occupant within. This was collected and kept in a sheltered location out of doors over the winter.

On 19 June 2000 an all black-coloured female *H. sanguinolentus* emerged from the cocoon. Day (1988) notes that the females usually have a 'reddish thorax', but this is something that appears to have rarely been seen in British specimens.

On 11 August 2000, with a better understanding of how to find the web refuges of the host spider, a visit was made to the Vales Moor area (SU1904) approximately 1 km to the west of Burley village. *Cheiracanthium* refuge webs were easily found in the tops of dead flower spikes and occasionally within the folded leaves of purple-moor grass. A number of web refuges were also found in the seed heads of common cotton sedge *Eriophorum angustifolium* and a smaller number of web refuges were found in the flowerheads of cross-leaved heath *Erica tetralix*. Many of the webs were found to contain either well grown hymenopterous larvae which may have been the

larvae of *H. sanguinolentus*, or cocoons; some simply contained adult female spiders or clusters of spiderlings. On the nearby Kingston Great Common National Nature Reserve (NNR) (SU1802), a web containing a cocoon was found, and collected. On 28 June 2001 an all black male *H. sanguinolentus* emerged.

On 26 March 2002, whilst surveying invertebrates on Kingston Great Common NNR for the English Nature Hampshire team, I discovered a *C. erraticum* web, complete with grey coloured cocoon, amongst cross-leaved heath seed heads. This was collected and kept indoors on a cool window sill. On 23 May 2002, another all-black female *H. sanguinolentus* emerged. This specimen has been deposited in the collections of Hampshire County Museums and Archives Service, housed at Chilcomb House, Winchester.

AN OBSERVATION OF A HOST-SEARCHING FEMALE

On 30 July 2004, while visiting Shatterford Bog (SU3405) in the south of the New Forest near Beaulieu, I was alerted by a predominantly black spider-hunting wasp frantically moving through the stems of bog myrtle *Myrica gale* on the edge of a wet flush. I was able to watch this specimen searching meticulously each individual leaf and leaf node of the myrtle bush for some minutes. It appeared as though a very thorough search was being made for the web refugia of *C. erraticum*. The wasp was then seen to fly lower down amongst the wetland vegetation, including cross-leaved heath, common cotton sedge and purple-moor grass. All the while this specimen was searching by means of crawling and walking rapidly with slightly jerking movements across the vegetation, every inch of leaf stem and flower head was covered before moving to the next stem or flower head. On netting and examining the specimen fully I was able to confirm that it was a female *H. sanguinolentus*, this time, with a deep blood-red coloured thorax. On release she flew off rapidly towards a stand of common cotton sedge some distance away in the nearby wet flush. No further sightings were made during the course of prolonged observations at this site.

CONSERVATION IMPLICATIONS

These records and observations show that contrary to the habitat requirements described by Falk (1991), *H. sanguinolentus* is a species more closely associated with wet heath and valley mire and not open woodland in heathy districts or verge heathland. Such sites need to be free from heavy grazing pressure to allow the host spider to construct its web refugia in the uppermost parts of the vegetation. All of these records and sightings have been from areas with considerably lower grazing pressure than many parts of the New Forest.

REFERENCES

- Anon. 1995. *Biodiversity: The UK Steering Group report. Volume 2: action plans*. London, HMSO.
- Day, M.C. 1988. *Handbooks for the Identification of British Insects Vol. 6, Part 4. Spider Wasps Hymenoptera: Pompilidae*. Royal Entomological Society of London.
- Edwards, R. (Ed.) 1997. *Provisional atlas of the aculeate Hymenoptera of Britain and Ireland. Part 1. Bees, Wasps and Ants* Recording Society. Huntingdon: Biological Records Centre.
- Falk, S. 1991. *A review of the scarce and threatened bees, wasps and ants of Great Britain*. Research and Survey in Nature Conservation. No. 35. JNCC, Peterborough.

THE INVERTEBRATE ASSEMBLAGE OF SOME ARABLE FIELDS IN WEST CORNWALL: A MISMATCH BETWEEN INVERTEBRATE AND PLANT CONSERVATION PRIORITISATION

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ABSTRACT

The invertebrate fauna of a complex of arable fields is described on the basis of a single day's survey. These fields are well-known to support important arable plant species and are good for farmland birds but the invertebrates had not previously been studied. About 60 species were recorded, mostly Coleoptera and Heteroptera. These include one Red Data Book beetle *Ochrosis ventralis* (Illiger) and eight Nationally Scarce species, most notably another flea beetle *Mantura rustica* (L.) (Chrysomelidae), the weevils *Sirocalodes quercicola* (Paykull) and *Stenocarus ruficornis* (Stephens) (Curculionidae), and the seed bugs *Aphanus rolandri* (L.) and *Scolopostethus pictus* (Schilling) (Lygaeidae). This assemblage is very important in the context of Cornwall and probably of significant interest nationally.

INTRODUCTION

The opportunity arose on 11 July 2003 to investigate the invertebrate fauna of an area of species-rich arable land on the West Pentire headland in Crantock Parish, close to Newquay in west Cornwall (SW7760). Arable plants are known to have been subject to huge decline as a result of 20th century agricultural development (Wilson, 1992). It is assumed that the same is true of arable invertebrate assemblages although this is much less well documented. Donald (1998) comments that there are invertebrates which are restricted largely to farmland, particularly arable land, and many of these formerly common species have declined to such a level that they are now rare and threatened. He provides no examples, however. Some of the best remaining arable habitat is on coastal farmland in Devon and Cornwall (Ford, 2003).

Management of rich arable flora is also good for farmland birds (Ford, 2003) and provides a type of sparsely-vegetated, frequently disturbed habitat that was previously much more widespread in the countryside but which has to a large extent been lost outside arable farmland. Seed of most arable plant species can remain dormant in the soil when the fields are not cultivated, although many of the more uncommon species have seed with limited dormancy periods and require ploughing in order to survive (Wilson, 1992). Arable invertebrates do not have the luxury of such dormancy and may be expected to have been lost to a far greater extent than the plants. So does one of the richest arable plant sites still support an interesting invertebrate fauna?

WEST PENTIRE AND ITS ARABLE PLANTS

The field system at West Pentire comprises eleven arable fields totalling 16 ha, on an exposed headland surrounded by herb rich maritime grassland, or inland by housing. The shallow, freely-draining, loamy acid soils receive significant influence of wind-blown shell sand from the bay below and are accordingly more calcareous than might otherwise be expected from the situation—it is also possible that local farmers

may have in the past brought this lime rich sand up onto the fields deliberately, to sweeten the ground further (I. Kemp, pers. comm.).

The special interest of this site for "arable weeds" has been known for many years, the local abundance of corn marigold *Chrysanthemum segetum* being one of the more eye-catching features. It also has many less obvious rarities such as Venus's-looking-glass *Legousia hybrida*, rough poppy *Papaver hybridum*, shepherd's-needle *Scandix pecten-veneris* and lesser snapdragon *Misopates orontium*. There are also more widespread species such as western ramping-fumitory *Fumaria occidentalis*, night-flowering catchfly *Silene noctiflora* and corn parsley *Petroselinum segetum* (Ford, 2003).

LAND MANAGEMENT

The agricultural tenant had been farming in a somewhat haphazard way since the land was acquired by the National Trust in 1960, the exposure of the headland in particular ensuring that any chemical inputs did not last long. The tenant died in 1989 enabling new arrangements to be developed (Ford, 2003). After a number of attempts to let the farm with herbicide restrictions, the local National Trust managers decided that it was not possible to marry the protection of such an important site with a commercial farming system, and decided to run it "in hand" to ensure the protection of the rare arable plant interest. In 1994 it became the first arable area to be awarded a grant under the Countryside Stewardship Scheme.

Using a local contractor, the fields are cultivated following a detailed plan drawn up in advance between the property staff and a local volunteer botanist. With a comprehensive annual survey, it is possible to give a fairly accurate assessment of the required management of each field. This includes fields which should be spring ploughed, those which should be autumn ploughed and those which should be left fallow to encourage biennials such as corn parsley. In most cases a shallow plough is used. A late light topping and occasional winter grazing have been used to control the amount of vegetation, which was clogging the plough. Initially no crop was sown, but after discussion with RSPB, it was decided to plant a thin crop of barley to act as a winter seed source for the many finches and buntings, which are a feature of the site. This management has resulted in a particularly fine arable plant flora and arable bird assemblage, but no-one had investigated the invertebrate assemblages.

The biggest problem is that of aggressive weeds such as couch grass *Elymus repens*, perennial sow thistle *Sonchus arvensis*, spear thistle *Cirsium vulgare*, creeping thistle *C. arvense* and ragwort *Senecio jacobaea*. The first two tend to suppress many of the rarer species, while the latter three are not popular with local farmers. Trials of small strip applications of glyphosate—a total weed killer—in September have been successful. The herbicide application has subsequently been used every five or so years on a rotational basis. The autumn application appears to only take out the target species while the desirable plants have already set seed. Unfortunately the herbicide use appears to be becoming less successful in controlling couch grass, and changes to the management system are now being considered, including a crop rotation (J.A. Lister, pers. comm.)

THE INVERTEBRATE FAUNA

A full day was spent on site and the main techniques used were standard sweep-netting and hand search. Conditions were ideal for observing insect activity—hot and sunny with a light onshore breeze. Emphasis was placed on certain Coleoptera and

Table 1. Full list of species recorded in arable fields at West Pentire, Cornwall, in July 2003.

Coleoptera		Heteroptera	
Apionidae		Coreidae	
<i>Apion frumentarium</i> (Paykull)		<i>Coreus marginatus</i> (L.)	
Cantharidae		Lygaeidae	
<i>Rhagonycha fulva</i> (Scopoli)		<i>Aphanus rolandri</i> (L.)	N
Carabidae		<i>Megalonotus emarginatus</i> (Rey)	
<i>Harpalus attenuatus</i> Stephens		<i>Scolopostethus pictus</i> (Schilling)	N
<i>Harpalus rufipes</i> (Degeer)		Miridae	
Chrysomelidae		<i>Asciodema obsoleta</i> (Fieber)	
<i>Chaetocnema concinna</i> (Marshall) s. str.		<i>Calocoris norwegicus</i> (Gmelin)	
<i>Gastrophysa polygoni</i> (L.)		<i>Dicyphus globulifer</i> (Fallén)	
<i>Longitarsus kutscheriae</i> (Rye)		<i>Orthocephalus saltator</i> (Hahn)	
<i>Longitarsus pellucidus</i> (Foudras)		<i>Stenotus binotatus</i> (Fab.)	
<i>Mantura rustica</i> (L.)	Nb	<i>Trigonotylus ruficornis</i> (Geoffroy)	
<i>Ochrosia ventralis</i> (Illiger)	RDB3	Nabidae	
<i>Phaedon tumidulus</i> (Germar)		<i>Himacerus mirmicoides</i> (Costa, O.)	
<i>Phyllotreta nemorum</i> (L.)		<i>Nabis ferus</i> (L.)	
<i>Psylliodes cuprea</i> (Koch, J.D.W.)		Pentatomidae	
Coccinellidae		<i>Dolycoris baccarum</i> (L.)	
<i>Coccinella 11-punctata</i> L.		<i>Podops inuncta</i> (Fab.)	
<i>Coccinella 7-punctata</i> L.		Rhopalidae	
Curculionidae		<i>Chorosoma schillingi</i> (Schummel)	
<i>Gymnetron rostellum</i> (Herbst)	Na	Stenocephalidae	
<i>Ceutorhynchus minutus</i> (Reich)		<i>Dicranocephalus agilis</i> (Scopoli)	Nb
<i>Ceutorhynchus obstructus</i> (Marshall)		Tingidae	
<i>Ceutorhynchus typhae</i> (Herbst)		<i>Tingis cardui</i> (L.)	
<i>Microplontus rugulosus</i> (Herbst)		Orthoptera	
<i>Rhinoncus pericarpus</i> (L.)		<i>Chorthippus parallelus</i> (Zett.)	
<i>Sirocalodes quercicola</i> (Paykull)	Na	<i>Tetrix undulata</i> (Sowerby)	
<i>Stenocarus ruficornis</i> (Stephens)	Nb	<i>Tettigonia viridissima</i> L.	
<i>Sitona lineatus</i> (L.)		Lepidoptera	
<i>Sitona sulcifrons</i> (Thunberg)		<i>Vanessa cardui</i> (L.)	
<i>Hypera arator</i> (L.)		Diptera	
<i>Hypera nigrirostris</i> (Fab.)		<i>Leptogaster cylindrica</i> (De Geer)	
<i>Hypera rumicis</i> (L.)		<i>Terellia tussilaginis</i> (Fab.)	
Elateridae		Molluscs	
<i>Athous bicolor</i> (Goeze)		<i>Candidula intersecta</i> (Poirét)	
Melyridae		<i>Cochlicella acuta</i> (Müller)	
<i>Psilothrix viridicoeruleus</i> (Fourcroy)		<i>Helix aspersa</i> Müller	
Nitidulidae		<i>Theba pisana</i> (Müller)	
<i>Meligethes aeneus</i> (Fab.)		Woodlice	
Oedemeridae		<i>Armadillidium vulgare</i> (Latreille)	
<i>Oedemera nobilis</i> (Scopoli)		<i>Philoscia muscorum</i> (Scopoli)	
Tenebrionidae			
<i>Cteniopus sulphureus</i> (L.)	Nb		
<i>Lagria hirta</i> (L.)			

Heteroptera, and the species counts were 35 and 17, respectively. Three species of Orthoptera, two of Diptera, four molluscs and two woodlice were also noted. The full species lists for the site are presented in Table 1. One species of Red Data Book (RDB) status and eight of Nationally Scarce status were found. Flea beetles (Chrysomelidae) and weevils (Curculionidae) provided the main interest amongst the beetles, while seed bugs (Lygaeidae) were prominent amongst the Heteroptera.

The key find was the RDB listed flea beetle *Ochrosis ventralis* (Illiger), associated with bittersweet *Solanum dulcamara*, and plentiful at this site. This has been known in Cornwall from a number of sites despite the county not featuring in the species account in Hyman & Parsons (1992). One Nationally Scarce species was also found to be plentiful here, *Mantura rustica* (L.), associated with broad-leaved docks *Rumex* spp on sandy soils. Two local species were also found: *Longitarsus pellucidus* (Foudras), which feeds on *Convolvulus arvensis* in ruderal situations, and *Psylliodes cuprea* (J.D.W. Koch) associated with hedge mustard *Sisymbrium officinale* and other Cruciferae.

The key finds amongst the weevils were large populations of the Nationally Scarce *Sirocalodes quercicola* (Paykull) and *Stenocarus ruficornis* (Stephens), as well as the presence of *Gymnetron rostellum* (Herbst). *Sirocalodes quercicola* is a particularly rare species nationally and which feeds on fumitories *Fumaria* spp, especially common fumitory *F. officinalis* (Hyman & Parsons, 1992) where it grows in disturbed soils. Common fumitory and common ramping-fumitory *F. muralis* both occur widely here as well as rarer ramping-fumitory species (Meredith, 2003) – one wonders if the entomologists who recorded the particular plant on which they have found the weevil were sufficiently good botanists to be able to distinguish these difficult fumitories successfully. Is such fumitory rich habitat a clue to the occurrence here of such a rare weevil? *Gymnetron rostellum* is also a rare species of disturbed soils, thought to be associated with mayweeds *Matricaria* spp, cudweed *Filago* and possibly speedwell *Veronica* spp (Hyman & Parsons, 1992). *Stenocarus ruficornis* is more widespread, the larvae developing in the roots of poppy species growing in disturbed soils, especially common poppy *Papaver rhoeas*. Neither *S. quercicola* nor *S. ruficornis* have been reported in the county since they were listed in the *Victoria County History* in 1906 (information from the Environmental Records Centre for Cornwall and the Isles of Scilly).

Aphanus rolandri (L.) is the most interesting of the bugs found. Arable land is a typical situation for this Nationally Scarce species although it is not confined to the situation. The key habitat features are given by Kirby (1992a) as: sunny, sheltered and well-drained, with a covering of dry leaf litter. It is not known which seeds it feeds on. The other Nationally Scarce bug found *Scolopostethus pictus* (Schilling) is mostly associated with stacks of dried plant material, particularly corn-stacks. It seems to favour base-rich sites (Kirby, 1992a). This is the first record for *A. rolandri* in Cornwall since 1956 (Alexander, 1997) while there is just one old unpublished record for *S. pictus* (S. Judd, pers. comm.). The third seed bug found *Megalonotus emarginatus* (Rey) is an uncommon species with only three previous records in the county (Judd, 1998).

Ground beetles (Carabidae) were disappointing although more species might be apparent at other times of the year. The presence of the local southern coastal species *Harpalus attenuatus* Stephens probably reflects the sparsely-vegetated sandy soils of this coastal headland rather than arable *per se*. Two of the other Nationally Scarce species present, the beetle *Ctenopus sulphureus* (L.) and the spurge bug *Dicranocephalus agilis* (Scopoli) are also primarily coastal species and are present here because of its situation and structural content rather than its arable habitat *per se* and both are local but widespread in the county. The bug *Chorosoma schillingi* (Schummel) and the mollusc fauna also fit into this category – wrinkled snail *Candidula intersecta* (Poiret), pointed snail *Cochlicella acuta* (Müller) and sandhill snail *Theba pisana* (Müller) all have a coastal distribution in the county.

The presence of larvae of painted lady *Vanessa cardui* (L.) on borage *Borago officinalis* in these fields has been reported elsewhere (Alexander, 2003).

BIODIVERSITY IMPLICATIONS

The rich findings from a single day's recording in July suggest that this particular site is of great interest for invertebrates that are able to exploit the special conditions provided by a species-rich arable system, and that further recording would be well worthwhile, particularly at other times of year when a different suite of species might be expected to be active. The invertebrate fauna of arable fields is a very neglected area other than in the pest control industry. It is instructive that Kirby (1992b) only covers the conventional semi-natural habitats so beloved of nature conservationists. There is not even a miscellaneous section covering other features of the cultural landscape. Fry & Lonsdale (1991) do cover these other aspects to some extent and include two pages on arable fields—in comparison with twenty on open grasslands. There appears to be no review of the special interest of arable land for invertebrates. Conservation research on arable invertebrates has tended to focus on their role as biomass for birdlife, and especially game birds (Donald, 1998; Boatman & Stoare, 1999). Nevertheless, these broad studies have been able to demonstrate that there are long-term trends of decreases in abundance of a wide range of invertebrate orders.

The habitat is not adequately covered by the UK Biodiversity Action Plan (BAP) (www.ukbap.org.uk). Cereal Field Margins (CFM) are a Priority Habitat but not the arable crop itself. The emphasis is very much on managing the margins to benefit wildlife without having a detrimental effect on the remaining cropped area. This is like allowing the core of ancient woodlands to be managed for conifer crops while protecting only the wood edge! The CFM Habitat Action Plan mentions that some 2000 species of invertebrates are commonly found in cereal fields but provides no breakdown on their conservation significance. It goes on to provide more detailed information about rare arable flowers and states that they are of conservation concern because of enormous national declines in their distribution and abundance. Overall, some 300 species of vascular plant can occur in arable fields, it states—vascular plant species are clearly much less significant than invertebrates in cereal fields and yet get all of the detailed attention.

Conservation in field margins may well be the most sensible way forward for conserving arable communities at landscape scale without having significant impact on agricultural cropping but this does not mean that the conservation of rare arable invertebrates should be overlooked. Interestingly, some of the rare arable plants known to be present at West Pentire are amongst the Priority Species in the UK BAP, including the two ramping-fumitories *Fumaria occidentalis* and *F. purpurea*. The inclusion of these arable plants as BAP species should help ensure conservation of extensive arable habitat. But it is not these plant species which are host to the rare invertebrates—these are dependent on host plants which are much more widespread. Choosing sites for special conservation measures based on rare vascular plants will not necessarily result in conservation of the rare invertebrates. The West Pentire example does suggest, however, that the underlying reasons why the rare plants have survived at this particular site may be the same or similar for the rarer invertebrates.

While it is possible for a few sites such as West Pentire to be managed as a nature reserve, true landscape scale conservation of these assemblages must be achieved mainly within the conventional farming system. Agri-environment schemes provide useful mechanisms for this but the key thing that is needed is a change of image, for arable plants and insects to be seen as part of our heritage by the people who farm the land, for them to be part of the products of land management, not an embarrassment and a nuisance.

ACKNOWLEDGEMENTS

Simon Ford was Property Manager North Cornwall for the National Trust until 2003 and was a key player in establishing the arable plant reserve. Thanks also to Ian Kemp, current Property Manager, for permission to carry out the invertebrate survey. Phil Wilson and Rose Murphy first drew attention to the great botanical interest of the fields. Hazel Meredith is a local volunteer botanist who monitors the plant interest. Janet Lister, Regional Nature Conservation Adviser for the National Trust also provided some background information.

Thanks to Mike Cox for help with Chrysomelidae and Peter Hodge with Ceuthorrhynchinae.

REFERENCES

- Alexander, K.N.A. 1997. Hemiptera. In: A. Spalding (Ed.) *Red Data Book for Cornwall and the Isles of Scilly*. Camborne: Croceago Press.
- Alexander, K.N.A. 2003 *Vanessa cardui* (L.) (Lep.: Nymphalidae) reared from *Borago officinalis*. *Entomologist's Record* **115**: 223.
- Boatman, N. & Stoate, C. 1999. Arable farming and wildlife—can they co-exist? *British Wildlife* **10**: 260–267.
- Donald, P.F. 1998. Changes in the abundance of invertebrates and plants on British farmland. *British Wildlife* **9**: 279–289.
- Ford, S. 2003. *Arable plant conservation on National Trust land in Cornwall*. In: Lister, J. (compiler) *Conservation of Arable land Flora. Notes taken on Training Days held at Kingswear, Devon, 10 July 2003 and Cubert, Cornwall 11 July 2003*. National Trust Devon & Cornwall Region (Unpublished).
- Fry, R. & Lonsdale, D. 1991. *Habitat conservation for insects—a neglected green issue*. Middlesex: Amateur Entomologists' Society.
- Hyman, P.S. & Parsons, M.S. 1992. *A Review of the Scarce and Threatened Coleoptera of Great Britain*. Part 1. UK Nature Conservation: 3. Joint Nature Conservation Committee.
- Judd, S. 1998. New national, regional and county records of British seed bugs (Hem., Lygaeidae). *Entomologist's Monthly Magazine* **134**: 311–314.
- Kirby, P. 1992a. *A review of the scarce and threatened Hemiptera of Great Britain*. UK Nature Conservation No. 2. JNCC.
- Kirby, P. 1992b. *Habitat Management for Invertebrates: a practical handbook*. Sandy: RSPB for JNCC.
- Meredith, H. 2003. *National Trust Arable Fields: West Pentire nr. Newquay Cornwall*. Unpublished report to National Trust Devon & Cornwall Region.
- Wilson, P.J. 1992. Britain's arable weeds. *British Wildlife* **3**: 149–161.

BOOK REVIEW

Living Jewels by P. Beckmann. (Prestel Publishing, London, 2004). 12pp. Hard cover £24.99. ISBN 3-7913-2528-0.

This is another book in the Prestel series on insects as art and consists of approximately 100 large beautiful colour photographs of beetles. Species selected are the large and beautiful with a high preponderance of tropical scarabaeids and cerambycids and not a dull staphylinid in sight. The author, Poul Beckmann is a printer and photographer with an interest in jewellery design as is his collaborator Ruth Kaspin, who prepared the insects for close-up studies. My favourite beetle is a challenge, not only because of its name, *Julodis hirtiventris sanguinipilig*, but because it has orange-tufted elytra and appears to use a mix of coleopterous and lepidopterous wing patterns, suggesting there is a commonality of gene expression in the imaginal 'discs' of the two Orders. A book to enjoy over a nice cup of organic coffee.

JOHN BADMIN

2004 ANNUAL EXHIBITION

Imperial College, London SW7 – 13 November 2004

The following account of exhibits has been compiled by R.D.G. Barrington (British butterflies), A.J. Pickles (British Macro-Lepidoptera), H.E. Beaumont (British Micro-Lepidoptera), N.M. Hall (Foreign Lepidoptera), P.J. Chandler (Diptera), P.J. Hodge (Coleoptera), A.J.A. Stewart (Hemiptera), and M.N. Smith (Hymenoptera and other Orders). The photographs of individual insects were taken by R.A. Jones and the cost of printing these was met by a grant from the Hammond Memorial Fund.

Forty or so members and guests attended the Society's Annual Dinner which took place in the Senior Common Room at Imperial College immediately following the exhibition. The meal was certainly enjoyable and the excellent company suitably relaxed after a day's intense entomology.

BRITISH BUTTERFLIES

BAILEY, K.E.J. – Butterfly aberrations from the collection of the late W. Graham Smith. *Polyommatus coridon* (Poda) from the Cambridge district, a fine female ab. *alba* B. & L. + *caeca* Courv. which shows a pure white ground colour on the underside, with all spotting absent except the discoidals. Also a gynandromorph showing a mixture of male and female on the left forewing, the rest of the insect being male. *Polyommatus bellargus* (Rott.), a male ab. *alba* B. & L. + *limbojuncta* Courv. *Mellicta athalia* (Rott.) an example of the melanic ab. *cymothoe* Bertolini.

Specimens reared in 2004 from various temperature experiments:

(1) *Aglais urticae ichneusa* (L.). A very interesting short series of specimens showing melanism, reared from heat-shocked pupae (Plate 1, Fig. 2). This strain originated from adults collected in Sardinia. This subspecies differs from the nominate *A. urticae* (L.) chiefly by a reduction in dark markings and absence of the small twin spots on the discal area of the forewing. However the melanism exhibited here followed the same pattern as that in temperature-shocked *A. urticae* (L.), tending towards the classic ab. *semiichneusoides* Pronin, of which examples from heat-shocked pupae were also shown.

(2) *Aglais urticae* ab. *pseudoconnexa* Cabeau, extreme specimens of this genetically multifactorial aberration, reared under normal conditions.

(3) *Apatura iris* (L.) ab. *iolata* Cabeau, which shows a reduction of the white banding, from heat-shocked pupae.

(4) *Cynthia cardui* (L.) ab. *rogeri* Meilhan from heat-shocked pupae. *Rogeri* is towards the extreme end of the range of aberrations that can be produced in this species from temperature-shock treatment.

(5) *Argynnis paphia* (L.) – very interesting aberrations from cold-shocked pupae showing heavily melanic forewings but nearly typical hindwings. Melanic aberrations of this species usually show the variation on all wings. However a few of the present form have been captured and reared in the past.

(6) *Argynnis aglaja* (L.) minor aberrations from heat-shocked pupae – this species appears to be very resistant to the effects of heat on patterning.

(7) *Boloria selene* (D. & S.) ab. *vanescens* Cabeau (reduced central spotting and extended outer spotting on the upperside, with streaked pearl colouring on the underside of the hindwings) from heat-shocked pupae.

(8) *Parage aegeria* (L.) a captured specimen with orange coloured spotting from Devon, July 2004, resembling ssp. *insula* (Howarth) from the Isles of Scilly.

(9) *Junonia everete* (Cr.), melanic aberrations reared from cold-shocked pupae (they could not survive below 0°C). The strain originated from wild female butterflies collected on Tobago, December 2003.

BARRINGTON, R.D.G. – Butterflies captured in 2004.

A melanic male *Polyommatus bellargus* (Rott.) from Dorset where the species had a very good season (Plate 1, Fig. 8). This aberration does not conform to the usual kind of melanism in *bellargus*. This specimen is essentially brown-black with a sprinkling of normal blue scales, mainly on the costa and outer areas of the forewings. Dark or melanic forms of this species usually show an even colouring without the sprinkling of typical scaling. The underside of the present specimen was more or less typical.

A female *Maniola jurtina* (L.) of an unnamed aberration from Dorset in which the underside of the hindwing entirely lacks the usual pale central band (Plate 1, Fig. 3), only three previous examples of this aberration are known.

Specimens bred in 2004:

(1) *M. jurtina* ab. *postaurolancea* Leeds, two male and three female examples of this rare aberration bred in an F₁ generation from a female aberration captured in 2003. 50% of this brood were aberrations, suggesting that it is controlled by a dominant gene.

(2) *Coenonympha pamphilus* (L.) A female ab. *unicolor* Tutt. This aberration shows no patterning to the underside of the hindwings, the whole wing being unicolorous and the normal white central patch absent. She laid about 80 eggs and two generations of butterflies were reared from these but no *unicolor* appeared in either brood. It would appear this aberration is controlled by a gene or gene system which has lethal effects, although this fails to explain the appearance of the aberration in the wild. Two male specimens bred in the F₂ generation were ab. *excessa* Leeds + *latiora* Leeds, having broad dark borders to the upperside and dark marginal spotting on the hindwings.

(3) *Polyommatus icarus* (Rott.), specimens from the Isles of Scilly bred in an F₁ generation from a captured female ab. *confluens* Courv. Most of the F₁ generation of about 80 butterflies showed some degree of this aberration though most were minor expressions. A pair was shown, both full *confluens*. Also shown from this brood were a pair in which the blue upperside scaling was paler than normal. It has been suggested that the Scillonian populations of this species show more variation in the colour of the blue scaling than on the mainland.

BUTLER, A. – Butterfly aberrations caused by temperature-shock treatment to the pupae.

A range of *Lycaena phlaeas* (L.) were shown, including some extreme aberrations. These were produced by treating the young pupae to heat shocks followed by a prolonged period of cool interrupted by brief periods of higher temperatures. The resulting butterflies ranged from those showing typical uppersides to extreme suffused examples in which the copper coloration was entirely obliterated by dark scaling (ab. *melanophlaeas* Villiers & Guenne—an extremely rare form in the wild) (Plate 1, Fig. 10). Some of these also showed inward elongation of the forewing spotting (ab. *extensa* Tutt). The original female was ab. *caeruleopunctata* Ruhl in which there is a row of small blue spots on the upperside of the hindwings. Some of the bred aberrations showed this form, but the colour of the spotting was steely-grey rather than blue.

The underside pattern and colour of some of these butterflies was also aberrant. In those showing heavy upperside dark suffusion, the normal underside orange colour was replaced by dirty buff or brown. Two very striking examples were shown with outward elongation of the forewing spotting (ab. *radiata* Frohawk) and a similar, though less extreme tendency on hindwings (Plate 1, Fig. 11). Very few wild examples of this extreme form are known.

Apatura iris (L.) aberrations reared from stock given to the exhibitor by K.E.J. Bailey. Multiple heat shocks to the pupae produced a range of aberrations. Two were shown—ab. *atava* Verity and *monophana* Cabeau.

HALSEY, J.—An attractive female *Polyommatus icarus* (Rott.) ssp. *mariscolore* (Kane) from the Burren, Co. Clare, Eire (1.vi.2004) showing strong blue upperside scaling and white rings around the discoidal spots.

HUMPHREY, D.A.—Various aberrations of *Polyommatus coridon* (Poda) including a very good male ab. *radiata* B. & L. + *albescens* Tutt in which the spotting is radiated towards the marginal lunules and the ground colour is whitish, from Wiltshire, 2004 (Plate 1, Fig. 7).

JONES, A.M.—The results of breeding from a female *Polyommatus icarus* (Rott.) ab. *extensa* Tutt captured 10.viii.2003. This aberration shows enlargement, and some slight outward elongation, of the underside submedian spotting. The F₁ which emerged in October 2003 contained 30 typical examples and 20 showing *extensa*. A small F₂ generation in December 2003 contained 13 type, 27 *extensa* and a single *radiata* Courv. showing the spotting strongly streaked out to the marginal lunules on all wings (an extreme form of *extensa*). Diapausing F₁ larvae gave rise to six adults in spring 2004 including a strong female aberration, which was paired to an unrelated typical male. The F₁ from this pairing contained 42 type and 25 strongly marked *extensa*. The F₂ contained 52 type, 91 *extensa* and 42 *radiata*. Most of this breeding work was carried out by the exhibitor's father, R. Jones. The strain is being maintained for further study.

Three rare aberrations of *Lycaena phlaeas* (L.). A captured male (18.ix.2004) approaching ab. *bipunctata* Tutt. The only spotting remaining on each upperside forewing of this aberration were the discoidal and the two nearest submedian spots which were displaced close to the discoidal. A bred female showed strong homoeosis on the upperside of the right forewing (Plate 1, Fig. 9). This consisted of large splashes of hindwing upperside colour and pattern. The shape of this forewing also showed hindwing characteristics. This was the only aberration to emerge from a brood of 71 adults. Homoeosis appears quite regularly in this species but the usual form shows small areas of forewing underside colour and markings reproduced on the underside of the hindwing. Very few examples as extreme as the present example have been recorded. The third specimen was a bilateral gynandromorph and was the only aberration to emerge in a brood of 44 adults.

A fine male example of a natural hybrid between *Polyommatus coridon* (Poda) and *Polyommatus bellargus* (Rott.), known as *polonus* Zeller, captured 13.vi.2004 (i.e. towards the end of the *bellargus* spring brood but before the emergence of *coridon*) (Plate 1, Figs. 5 & 6). It has always been of very rare occurrence in England and this is the first example recorded for many years. The blue colour and upperside pattern are clearly intermediate between the species but the underside is closer to *coridon*. *Polonus* is recurrent on Mt Chelmos, Peloponesos. Studies by de Lesse (in Higgins & Riley, 1975) on nine specimens of *polonus* have shown that chromosome numbers varied from 52–70. Typically *bellargus* has a chromosome count of 45 and *coridon* has 80–90, depending on the race.

KNILL-JONES, S.—Two examples of *Polygonia c-album* (L.) from the exhibitor's garden at Totland, Isle of Wight. The first was a dwarf example with a wingspan of 33mm, captured 18.x.2004. The second was an unusual form of aberration in this species in which the central dark spots of both fore and hind wings are joined.

LUCKENS, C.J.—Three bred examples of *Hipparchia semele* (L.) showing dark russet replacing much of the normal beige markings on the upperside. They were bred from a similar captured female from Dorset. From 30 ova, 11 butterflies emerged, eight showing this aberration to varying degrees. Pairings between them produced infertile eggs.

An example of *Cupido minimus* (Fuessl.) with obsolete hindwing undersides, ab. *postobsoleta* Tutt, captured in Wiltshire, May 2004.

An *Aricia agestis* (D. & S.) in which the normal reddish lunules on the underside are outlined in black on a grey ground. Captured in Wiltshire, May 2004.

Two examples of *Polyommatus bellargus* (Rott.) ab. *krodeli* Gillmer, in which the underside spotting is absent apart from the discoidal spots (this aberration and similar less extreme expressions of it appeared regularly in some areas, and in both broods, during 2004, which was an outstanding season for the species).

TEBBUTT, P.—Butterflies bred from various temperature experiments.

Cold shocks on pupae of *Argynnis paphia* (L.) produced a range of melanic aberrations including the abs. *confluens* Spuler, *ocellata* Frings and the extreme form *nigricans* Cosm. A single heat shock on *Cynthia cardui* (L.) produced a gradation of aberrations from ab. *priameis* Schultz to abs. *elymi* Rambur and *rogeri* Meilhan.

Heat shock to *Colias croceus* (Geoffroy) produced an attractive pair of ab. *nigrofasciata* Verity, in which the main feature is the joining of the forewing discoidal spot to the black margins by a streak of black scaling (Plate 1, Fig. 4). Other minor aberrations emerged from over 100 treated pupae, including female ab. *pseudomas* Cockerell, in which the yellow spotting is missing from the black margins.

Mixed shock regimes on *Lycaena phlaeas* (L.) produced a range of aberrations including ab. *remota* Tutt (forewing submedian spotting displaced outwards); ab. *extensa* Tutt (forewing submedian spotting streaking inwards), an unnamed form with just the three upper submedian spots of the forewings remaining and ab. *latomarginata* Tutt in which the dark outer border of the forewings is very broad, almost reaching the discal spots.

Two specimens bred under natural conditions were *Erebia aethiops* (Esper), an unnamed aberration with the median band on the underside of the hindwing shortened, and an *Hipparchia semele* (L.) ab. *monocellata* Lempke, showing on the underside only.

Captured specimens included *Coenonympha pamphilus* (L.) ab. *anticastanea* Leeds in which the basal half of the underside forewing is suffused with darker coloration and a series of *Aphantopus hyperantus* (L.) taken in a period of thirty minutes. This included ab. *caeca* Fuchs (no underside spotting), ab. *arete* Müller (spotting absent except for the white pupils) and ab. *marpurgensis* Strand (six hindwing spots). The highlight of this exhibit was a fine male of the rare *Argynnis aglaja* (L.) ab. *pallida* Tutt captured in northern England in 2004, in which the ground colour was approaching white (Plate 1, Fig. 1).

WEDD, D.—A female *Lampides boeticus* (L.) captured at Marsh Lock on the Thames in September 2003 and a pair of specimens reared from her in the winter of 2003.

Butterflies from Alderney, Channel Islands included four examples of a striking race of *Maniola jurtina* (L.), two blue females of *Polyommatus icarus* (Rott.) (the exhibitor states that this race consistently produces blue females) and *Lycaena*

phlaeas (L.) ab. *fuscae* Robson (forewing copper colour suffused with darker scaling—usually a product of high temperatures acting during the early pupal stage).

WINOKUR, L.—A striking example of *Aglaia urticae* (L.) ab. *pallida* Frohawk in which the ground colour is white. This was caught by a friend of the exhibitor on 28.viii.1983 (when the captor was aged eleven) from *Buddleja* at the corner of Manor Road and Drove Close, Twyford, Hampshire VC11 (SU478242).

Typical white specimen and a 'buff-tinted' example of *Melanargia galathea* (L.) captured 6.vii. and 26.vii.2004 respectively, along 'The Avenue' at Black Wood near Micheldever Station, Hampshire VC12 (SU536434). The population was at its highest level at this location for eight years.

BRITISH MACROLEPIDOPTERA

Exhibits of moths from the Channel Islands are included under British Macrolepidoptera although it is recognised that they are not part of the British fauna. Only D. Wedd exhibited Channel Isles insects this year and they are listed under his name. One guest, S. Clancy, exhibited and his details are included with those of members.

AGASSIZ, D.J.L. & KIDDIE, R.—Migrant species. *Trachea atriplicis* (L.), Gravesend, Kent. 24.vii.2004; *Syngrapha interrogationis* (L.), Gravesend, Kent. 13.viii.2004.

ALBERTINI, M.—*Eublemma purpurina* (D. & S.). This migrant species was seen in the UK for the first time during 2004. There have been 11 published records from 31.vii.2004 to 22.viii.2004. Most records have been more or less coastal: three for the Isles of Scilly, three for Cornwall, two for Dorset, and two for Hampshire. The exception is one for Buckinghamshire, about 80 miles inland from the nearest other record (Portsmouth). The Bucks specimen, (exhibited), was seen at Coombe Hill (National Trust), near Wendover, Bucks on 17.viii.2004 by Martin Albertini and Peter Hall. In about three hours only 41 macro species were found, with *Autographa gamma* (L.) being the only other migrant. In mainland Europe the species ranges from Spain to southern Scandinavia and east over much of the continent. The larval foodplant is Creeping Thistle *Cirsium arvense*.

BROWN, D.—*Zygaena lonicerae* (Scheven) ssp. *latomarginata* Tutt, Combrook, Warks., 20.vi.2004. An extreme confluent aberration. (Plate 2, Fig. 9).

CLANCY, S.—Moths recorded during 2004 in South-East Kent unless otherwise stated.

Godonella [*Chiasmia*] *aestimaria* (Hb.), New Romney, 28.ix.2004, the second British record. Three species new to the county in 2004:—*Dendrolimus pini* (L.), Littlestone, 2.viii.2004; *Proxenus* [*Athetis*] *hospes* (Freyer), Dungeness, 25.viii.2004 and *Catocala electa* (Vieweg), Lydd-on-sea, 24.viii.2004. Two examples of *Platyperigea kadenii* (Freyer), New Romney, 29.ix.2004 and 5.x.2004. *Cryphia raptricula* (D. & S.), Dungeness, 14.viii.2004. Other immigrant specimens—*Drepana curvatula* (Bork.), New Romney, 11.viii.2004; *Hyles euphorbiae* (L.), Lydd-on-Sea, 7.viii.2004; *Thaumetopoea processionea* (L.), Lydd, 12.viii.2004; *Conistra erythrocephala* (D. & S.), Dungeness 25.x. and Lydd-on-Sea 2.xi.2004; *Trachea atriplicis* (L.), New Romney, 26.vi.2004; *Chortodes extrema* (Hb.), Dungeness, 7.vi.2004; *Macdunnoughia confusa* (Steph.), Lydd-on-sea, 29.vii.2004; *Chrysodeixis chalcites* (Esp.), Lydd, 14.x.2004, and *Catocala sponsa* (L.), Dungeness, 7.viii.2004. Species likely to now be breeding in South-East Kent or on the verge of colonising the area. *Thera cressata* (Geyer), Lydd, 2.xi.2004, the third county record since 1999 and the second consecutive year that this species has occurred in the area. *Euplagia quadripunctaria* (Poda), two examples of at least six area records in 2004. *Noctua*

janthina (D.&S.), two examples of at least 59 area records in 2004. *Aethria* [*Hecatera*] *dysodea* (D.&S.), two examples of at least 16 area records in 2004. *Cryphia algae* (F.), two examples of at least 13 area records in 2004. Also exhibited was a female *Macaria signaria* (Hb.) from Barham, Kent on 4.viii.2004. With a second having been taken nearby in the Canterbury area a few days later this provides further evidence that this species may be a low-level resident in the county. Aberrations shown included a banded *Thera britannica* (Turner) from Orlestone Forest, Kent on 19.x.2004; a suffused example of *Crocallis elinguaris* (L.) from Minsmere, Suffolk on 26.vii.2004; an extreme melanic male *Arctia caja* (L.) taken at Dungeness, Kent on 28.vii.2004 and the melanic ab. *scopariae* Mill. of *Xestia agathina* (Dup.) from Buxton, Cheshire on 5.ix.2004.

CLARKE, J. – Moths taken or bred in the year. *Idaea muricata* (Hufn.), Meathop, Cumbria, 10.vii.2004, taken in flight. *Perizoma taeniata* (Steph.), Myrtleberry Cleave, Watersmeet, Lynton, North Devon, 12.vii.2004. *Herminia tarsicrinalis* (Knoch.), Tunstall, East Suffolk, bred ex female which came to MV on 3.vii.2003. *Euphyia biangulata* (Haw.), Churchstanton, Somerset, bred ex female beaten from hedge 17.vii.2004. *Hydriomena ruberata* (Freyer), Blawagown River, Strathorry, Scotland, at MV, 28.v.2004. *Selenia lunularia* (Hb.), near Tenterden, Kent, 21.vii.2004, a second brood example at MV. *Hyles livornica* (Esp.), Durlston Head, Swanage, Dorset, at MV, 15.vi.2004. *Parasemia plantaginis* (L.) ab. *hospita* D.&S., Meikle Elrick, Braemar, 6.vii.2004, in flight. *Agrotis ripae* (Hb.), Brean/Berrow, Weston-super-Mare, Somerset, vii.2004 at MV. *Acronicta euphorbiae* (D.&S.) ssp. *myricae* Guen., Blawagown River, Strathorry, 28.v.2004 and Rannoch Moor, Scotland, 27.v.2004. *Apamea crenata* (Hufn.) ab. *alpecurus* Esp., Braemar, Scotland, 6.vii.2004. Very dark examples of this form. *Hyppa rectilinea* (Esp.), Blawagown River, Strathorry, Scotland.

CLIFTON, J. – *Polia bombycina* (Hufn.), Norfolk, 2004. *Idaea ochrata ochrata* (Cook), Norfolk, 2004.

COOK, R. – *Tethea fluctuosa* (Hb.) ab. *albilinea* L., Loch Arkalg, Inverness 7.vii.2004. *Orthonama vittata* (Bork.), bred from Troublefields Reserve, Hurn, Dorset and fed on yellow bedstraw. *Chloroclystis debiliata* (Hb.), bred from larvae found at Abinger, Surrey on 8.v.2004.

CRONIN, A.R. – *Callimorpha dominula* (L.), an extreme example of ab. *bimacula* Cockayne from stock bred to generation F₁₃ (Plate 2, Fig. 5).

DICKSON, R. – A rare migrant, *Macdunnoughia confusa* (Steph.), Fareham, Hampshire, 5.v.2004.

DOBSON, A.H. – *Idaea muricata* (Hufn.), form *auroraria* (Borkh.), Stoborough Heath, 31.vii.2004. Flushed from the mire, a new record for the reserve. A male *Clostera pigra* (Hufn.), which was swept by day from *Salix repens*; *Idaea degeneraria* (Hb.) a tattered specimen rescued from the Rothamsted trap catch for the night of 26 to 30. viii.2004, Starcross. This is only the second migrant specimen from Devon since the species became extinct at Redgate Cliffs, Torquay. *Acontia lucida* (Hufn.), Sherborne St John, 13.viii.2004, new to VC12 and found resting on his MV light trap by N. Montegriffo.

EZARD, A.S. – Species recorded at Spurn Peninsula, East Yorkshire. *Archana sparganii* (Esp.), *Simyra albovenosa* (Goeze), *Scopula emutaria* (Hb.), *Cryphia muralis* (Forster) (first Yorkshire record), *Sideridis albicolon* (Hb.), *Cucullia asteris* (D.&S.), *Chortodes elymi* (Treitschke), *Apamea oblonga* (Haw) and *Mythimna litoralis* (Curt.)

GILL, N. – Moths taken on trips to Scotland during 2003/04. *Epirrhoe alternata* (Müll.) ssp. *obscurata* South, *Mythimna impura* (Hb.) f. *scotica* Cockayne and *Lycia zonaria* (D. & S.) ssp. *atlantica* Harrison, from Lewis, Outer Hebrides. *Chloroclysta*

concinna (Steph.) bred from Arran. *Chloroclysta truncata* (Hufn.) and *Protolampra sobrina* (Dup.) from Carrbridge, Inverness and *Anarta melanopa* (Thunb.) from Lecht.

HALSEY, J. – *Ennomos quercinaria* (Hufn.), Bonchurch, Isle of Wight, 7.vii.2003. *Xestia xanthographa* (D. & S.), Wicken Fen, 6.ix.2004. *Cosmia pyralina* (D. & S.), Wicken Fen, 19.vii.2004, almost certainly the first melanic recorded in Britain and perhaps similar to ab. *obscura* Hoffman & Kloss. *Colotois pennaria* (L.), Kilchoan, Ardnamurchan. 28.x.2003, a very dark example. *Conistra erythrocephala* (D. & S.), Bonchurch, Isle of Wight, 13.ii.2004. After a month in captivity she produced hundreds of infertile eggs. *Euthrix potatoria* (L.), female with good coloration.

HARMAN, T. – The first British specimen of *Chiasmia* [*Godonella*] *aestimaria* (Hb.), Sholden, Deal, Kent. 16.viii.2004. Taken by Lynn Hirst.

HART, C. – Records, mainly from Buckland, near Reigate, Surrey in 2004. *Eupithecia phoeniceata* (Ramb.), the second specimen recorded in 23 years in Buckland. Another one was recorded in Surrey at the same time, which indicates it was part of a migration, rather than a chance vagrant. *Trichopteryx polycommata* (D. & S.). Mr Hart regularly visits the north downs near Dorking in the summer in search of plume moths and noticed a good stand of wild privet at one spot. He returned on 31.iii.2004 and found two female *T. polycommata* settled on small privet bushes. These are the first Surrey records for 43 years. Both moths were kept for eggs which they duly laid. In mid May he returned over 40 fully-fed larvae to the site. *Aleucis distinctata* (H.-S.). Collins (1997) describes Sloe Carpet as 'very local and scarce [in Surrey]' and this is only the third specimen of this local moth recorded at Buckland in 23 years. It is assumed these records are of vagrants which have flown in from the wealden clay further south. *Helicoverpa armigera* (Hb.). A larva found whilst slicing beans for dinner on 12.xi.2004. It is a Surrey specimen as the beans were bought at Waitrose in Horley, although the packet label claims Spain as the country of origin.

HAYWARD, R. – *Epirrhoe alternata* (Müll.), Roo Turlough, Gort, Co. Galway, 3.viii.2004. To actinic light of Ian Rippey and passed live to the exhibitor as an example with the central band reduced to a dot. Although this is apparently a recurrent form it does not appear to have been named. *Pterostoma palpina* (Cl.), Slough, 15.vii.2004, a very dark form to MV. *Agrotis puta* (Hb.), Slough, 17.v.2004, a melanic male with 'shuttles' obscure, possibly ab. *obscura* Tutt. *Orthosia gothica* (L.), Slough, 28.iv.2004, a plain dull grey form with basal line joining the quadrate marks missing. *Mesapamea secalis* (L.)/*Mesapamea didyma* (Esp.), Inch, Co. Kerry, 9.viii.2004.

It was a poor year for migrants in Slough in 2004 and the following were exhibited. *Agrotis ipsilon* (Hufn.), Slough, 6.ix.2004 and *Peridroma saucia* (L.), Slough, 24.ix.2004. Some moths bred during 2004 – *Cyclophora linearia* (Hb.), emerged 30.viii.2004, part of a dark second brood bred from a Chilterns' female taken 18.vii.2004. The larvae refused beech and all other food plants except oak. Some of the pupae from this brood are overwintering. All specimens so far have been female. *Mormo maura* (L.), bred 23.vi.2004 from larva found on garden pyracantha.

New species added to the site list from the exhibitor's town garden in Slough, Berkshire during 2004 where the total of macro-moths now stands at 363 – *Ptilodon capucina* (L.), 18.v.2004, *Pseudoips prasinana* (L.), 14.vi.2004, *Apamea ophiogramma* (Esp.), 28.vii.2004 and *Aetheria* [*Hecatera*] *dysodea* (D. & S.), 10.vii.2004. Five wild larvae of *A. dysodea* were found during August within a few hundred metres of the garden trap, and of these, four produced overwintering pupae and one produced a parasitoid.

HENWOOD, B. – *Mythimna turca* (L.) reared from larvae found feeding on *Carex panicea*, carnation sedge near Hatherleigh, North Devon by B.P. Henwood and R.J. Wolton. *Carex panicea* is a previously unknown foodplant. Larvae have not been found feeding on *Carex* spp. before in Britain but on the continent have been found on *Carex hirta* and *Carex brizoides*.

HIGGOTT, J.B. – *Catocala conjuncta* (Esp.), Minsmere RSPB Reserve, East Suffolk, 14.ix.2004, the first British record. The individual was trapped at MV light by Robin Harvey and identified by J.B. Higgott. *C. conjuncta* is a circum-Mediterranean species, occurring as close to Britain as interior north-west France (Goater, *Noctuidae Europaeae* Vol 10, 2003).

JENKINS, A. – *Perizoma taeniata* (Steph.). Two taken at light in North Devon and two taken at light in Scotland. *Cyclophora pendularia* (Cl.), second generation examples from Dorset larvae. *Selenia lunularia* (Hb.) from Inverness-shire at MV. *Lobophora halterata* (Hufn.), Inverness-shire, a contrasting form typical of the area. *Pseudopanthera macularia* (L.) from South Devon with speckles forming bands in both fore and hind wings. *Epione vespertaria* (L.), males taken at light and females found at rest on alder trees. *Ecliptopera silaceata* (D. & S.), taken at light in Inverness-shire and displaying rings in the central bands. An unusually white *Venusia cambrica* (Curt.) from North Devon. *Perizoma minorata* (Treitschke) ssp. *ericetata* (Steph.) netted in late afternoon sunshine at Aviemore, Scotland. *Spilosoma lubricipeda* (L.), a Scottish form from car headlamps at Trinafour, Scotland. *Agrius convolvuli* (L.), bred from wild larva found at Swanage, Dorset in 2003 when over forty were seen.

JONES, R.A. – *Bembecia ichneumoniformis* (D. & S.), swept on a flowery brownfield site beside the River Medway, central Rochester, 15.vi.2004. This uncommon moth breeds in the roots and stems of bird's foot trefoil and kidney vetch and is usually found on chalk downland or coastal grasslands; it was exhibited as part of a larger exhibit of insects found on brownfield sites.

KNILL-JONES, S. – Moths taken at Totland, Isle of Wight unless otherwise indicated. *Nycteola reavayana* (Scop.), 10 and 12.iv.2004; *Trichopteryx carpinata* (Borkh.), 14.iv.2004; *Scopula immutata* (L.), 29.vi.2004; *Eupithecia subfuscata* (Haw.), 3.vi.2004; *Idaea aversata* (L.), 31.vii.2004; *Aporophyla lutulenta* (D. & S.), Afton Down, 24.ix.2004 and *Agrotis clavis* (Hufn.), 18 and 26.vi.2004, aberrations. *Orthosia munda* (D. & S.), 27.iii.2004 and 11.iv.2004. An aberration of *Agrotis trux* (Hb.) ssp. *lunigera* (Steph.), 26.vi.2004. An aberration of *Ochropleura plecta* (L.). Aberrations of *Hoplodrina ambigua* (D. & S.), 25.vi. to 5.ix.2004. *Diarsia brunnea* (D. & S.), 28.vii.2004; *Leucochlaena oditis* (Hb.) 2.xi.2004; *Mythimna pudorina* (D. & S.), 9.vii.2004; *Agrotis ripae* (Hb.) 10.vi.2004 and *Drymonia ruficornis* (Hufn.) 30.iv.2004. *Drymonia dodonea* (D. & S.), a pale form from Parkhurst Forest 25.v.2004. *Agrius convolvuli* (L.), bred from a larva found at Niton, Isle of Wight and hatched 5.vi.2004. *Laothoe populi* (L.), a dwarf form with a wing expanse of only 48 mm, taken on 7.viii.2004 and a reddish form on 31.vii.2004. Two extreme aberrations of *Orthosia gothica* (L.), 18.iv.2004 and 1.v.2004. An extreme aberration of *Xestia c-nigrum* (L.) with the right forewing plain and the Hebrew character washed out, 27.v.2004. *Thera cupressata* (Geyer) having a central band on the forewing similar to *Thera britannica* (Turner), 27.vii.2004, (Plate 2, Fig. 7). *Xanthorhoe designata* (Hufn.), an example with differing red bands on the forewings. A well marked specimen of *Opisthograptis luteolata* (L.) with a central bar. *Tyta luctuosa* (D. & S.), 5.viii.2004. Three *Lithosia quadra* (L.) on 8, 10 and 21.viii.2004. *Trachea atriplicis* (L.), 17 & 24.vii.2004. *Peridroma saucia* (Hb.), 19.ix.2004, a melanic variation. *Dryobota labecula* (Esp.) 31.x.2004. The following specimens were taken in the period of considerable migration during February 2004: – *Spodoptera*

exigua (Hb.) three specimens on 4, 7 and 11.ii.2004; *Heliothis armigera* (Hb.), two on 12.ii.2004 and *Heliothis peltigera* (D. & S.), three on 11 and 12.ii.2004. *Mythimna loreyi* (Dup.), taken by D.B. Wooldridge at Freshwater on 13.ii.2004; where he also took *Autographa gamma* (L.) by day on 18.ii.2004. *Agrotis ipsilon* (Hufn.) and *Trichoplusia ni* (Hb.) both on 11.ii.2004.

KOLAJ, A.J. – *Agrochola helvola* (L.) from Balgowan, Highlands, Scotland 1.ix.2004. A striking aberration with the outer quarter of the wing dark brown except for the fringe and the inner quarter shaded in dark brown (Plate 2, Fig. 1). *Lasiocampa quercus* (L.), Hamstreet, Kent 23.vii.1996, a small, pale specimen. *Hypena rostralis* (L.), Lakenheath, Suffolk ex larva, 3.vii.2004. Unicolorous form with a broad, pale band along the costa and a pale patch on the outer area of each wing. *Noctua janthina* (D. & S.), Swanage, Dorset 31.vii.2004. *Xestia agathina* (Dup.), a melanic example bred in 1994 ex larva from Cannock Chase, Staffs. *Allophyys oxyacanthae* (L.), a melanic example much darker than f. *capucina* Mill., from Coventry, Warks. 14.x.2004. *Nycteola revayana* (Scop.), f. *ramosana* Hb., 19.ix.2004, Bradwell, Essex and an unknown form from Coventry, Warks. *Eupithecia exiguata* (Hb.), a melanic specimen exhibited with a typical form and a melanic *Eupithecia abbreviata* (Steph.) for comparison.

LANGMAID, J.R. – *Agrotis exclamationis* (L.), an asymmetrical aberration with smudge-like fuscous markings on the right forewing. Southsea, Hants, 1.vi.2004. *Noctua janthina* (D. & S.), Southsea, Hants, 22.vii.2004. *Cryphia algae* (F.), Southsea, Hants, 9.viii.2004.

LOVE, S. & M. and DEWHURST, C. – All moths except otherwise stated from Ellanore Farm, West Wittering, West Sussex. *Drepana curvatula* (Bork.), 9.viii.2004, Pagham Harbour, West Sussex; a migrant taken by C. Glanfield. *Idaea rusticata* (D. & S.) viii.2004 from a strong local population. *Rhodometra sacraria* (L.), the only specimen of this migrant in 2004. *Orthonama obstipata* (F.), 3.viii.2004. *Thera cypressata* (Geyer) 4.ix.2004; this species is probably naturalised in West Sussex. *Lymantria dispar* (L.), 3.viii.2004, a migrant. *Cybosia mesomella* (L.) ab. *flava* de Graf, 4.vii.2004. *Lithosia quadra* (L.), 9.viii.2004, a migrant from Pagham Harbour, West Sussex taken by C. Glanfield. *Agrotis vestigialis* (Hufn.), viii.2004, from coastal dunes. *Noctua janthina* (D. & S.), 6 and 8.viii.2004. *Sideridis albicolon* (Hb.), 6.vi.2004. *Mythimna albipuncta* (D. & S.), ix.2004, a specimen having an aberrant marking on the left forewing. *Mythimna litoralis* (Curt.), 5.viii.2004, locally frequent. *Mythimna obsoleta* (Hb.), 2004. *Thaumatopoea processionea* (L.), 18.viii.2004 and one from a later date in August, migrants. *Cryphia algae* (F.), 2 and 11.viii.2004. *Apamea oblonga* (Haw.), 9 and 26.vii.2004. *Trichoplusia ni* (Hb.), 11.viii.2004. *Catocala sponsa* (L.), 10.viii.2004, a presumed migrant recorded during a period of intense migrant activity with other records of this species elsewhere on the south coast.

MCCORMICK, R.F. – Species seen in Devon during 2004. *Hepialus hecta* (L.), Quoditchmoor, near Ashwater, 29.v.2004. *Synanthedon tipuliformis* (Cl.), Kenwith Valley, 7.vi.2004; Stephen Hatch attracted three to pheromones. *Synansphecica muscaeformis* (Esp), Westward Ho, 14.vi.2004, Stephen Hatch attracted 11 to pheromones. *Malacosoma castrensis* (L.), Axmouth Saltings, 29.vii.2004; larvae were found commonly in June by Barry Henwood. *Tethea or* (D. & S.), Coombe Meadow, near Hatherleigh, vi.2004. The species is now found in at least four sites in the Hatherleigh area. *Cyclophora pendularia* (Cl.), from a known Dorset locality where larvae of varying sizes were beaten from sallow on 28.viii.2004. The imagines emerged from mid ix.2004, with some laying over. *Timandra comae* (Schmidt), from Garden Lodge, Wembury, near Plymouth, 26.vii.2004 (Plate 2, Fig. 10). This over-all

red form was taken by Paul Stubbs and is now in the exhibitor's collection. *Scopula ternata* (Schränk.), Challacombe Farm, Dartmoor, 5.vii.2004; Redlake, South Dartmoor, 29.vi.2004; Braunton Burrows, 2.vi.2004; Headland Warren, Dartmoor, 15.vi.2004. *Xanthorhoe fluctuata* (L.), a miniature specimen taken at Treedown Farm, near Bow on 6.v.2004. *Chloroclysta citrata* (L.), a miniature specimen taken at Tavistock 20.ix.2004, the late date and size indicating it was probably a second brood specimen. *Perizoma taeniata* (Steph.), Watersmeet, 12.vii.2004. The species has now been found in four 1 kilometre squares in the Watersmeet valley. On this date and previous visits only males were seen. *Perizoma bifasciata* (Haw.), one of three specimens seen at Wembury on 15.viii.2004. *Eupithecia inturbata* (Hb.), Axmouth Saltings, 29.vii.2004, together with one from the exhibitor's garden at Teignmouth on 1.viii.2004. *Eupithecia simplicata* (Haw.), Axmouth Saltings, 29.viii.2004. *Venusia cambrica* (Curt.), Watersmeet, 12.vii.2004, where several were seen throughout the valley. *Crocallis elinguaris* (L.), a very small specimen taken in Teignmouth on 8.vii.2004, with an odd shaped band (Plate 2, Fig. 8). *Biston betularia* (L.), an odd colour form taken at Teignmouth on 15.vii.2004. *Aethalura punctulata* (D. & S.), from Stover Park, 4.vi.2004. *Acherontia atropos* (L.), Exeter, St Thomas. Three larvae were found in a garden under a bush of a cultivar of *Solanum nigrum*, black nightshade from 15 to 23.ix.2004. There were at least four more sightings in the Exeter area after the first of these was publicised in a local newspaper. *Hemaris fuciformis* (L.), Roborough Down, north of Plymouth, 28.vi.2004, observed and photographed by Peter Norwood and verified with the retained picture. *Hyles livornica* (Esp.), Tavistock, 9.vi.2004, taken by Fred Slatter in his light trap. *Furcula bifida* (Brahm.), Coombe Meadow, near Hatherleigh, 9.vii.2004, taken by Rob Wolton, the first confirmed specimen since 1997. *Ptilodontella cucullina* (D. & S.), Watersmeet, 12.vii.2004, a site where this species is seen on a regular basis. *Thaumatopoea proceSSIONEAE* (L.), the first specimen for Devon, was taken in Teignmouth on 9.viii.2004. *Atolmis rubricollis* (L.), Lydford Butterfly Conservation Reserve, seen on 5.vi.2004, by Jim and Cath Braven. This species is infrequently seen in Devon. *Lithostia quadra* (L.), Warleigh Point Nature Reserve, Plymouth, 6.viii.2004 and Lopwell Dam, 17.vii.2004, seen by members of the Devon Moth Group. *Euxoa obeliscus* (D. & S.) ssp. *grisea* (Tutt.), the first specimen recorded since 1999, this one at Hartland Point, 31.viii.2004. *Cerastis leucographa* (D. & S.), Lewmoor, near Hatherleigh, 14.iv.2004. This is a new site for this species in Devon. *Lacanobia suasa* (D. & S.), Axmouth Saltings, 4.viii.2004. Two worn specimens were seen. *Orthostia populeti* (F.), Coombe Meadow, near Hatherleigh, 14.iv.2004. The species can now be found in at least four 1-kilometre squares in the Hatherleigh area. *Lithophane semibrunnea* (Haw.), seen at Wembury, near Plymouth, iv.2004 and Axmouth, 11.iv.2004. *Xylota vetusta* (Hb.), Hatherleigh area, 26.x.2003 with several sightings in April time and one at Watersmeet, 1.v.2004. *Conistra erythrocephala* (D. & S.), taken at Shaugh Prior, Shaugh Bridge, Dartmoor on 12.ii.2004. This male, taken by Andy Trout is the first in Devon since the *Victoria County History* (1906). *Moma alpium* (Borkh.), recorded from a trap sited in Rosemoor Gardens, Great Torrington, 26.vi.2004, and which now adds another 1-km square for the species along the Torrington valley. *Acrionicta aceris* (L.), Sampford Peverell, near Tiverton, 15.vii.2004, from Waggs Plot Farm, near Axminster, vi.2004, and Holyford Wood, near Colyford, 17.vii.2004. *Craniophora ligustri* (D. & S.), an overall black specimen from Tavistock, vii.2004. *Dypterygia scabriuscula* (L.), Rosemoor Gardens, Great Torrington, 19.vi.2004. This area seems to be a reliable place to see this species. *Ipimorpha subtusa* (D. & S.), from Hatherleigh area, 10.vii.2004 and Treedown Farm, near Bow on 13.viii.2004. *Arenostola phragmitidis* (Hb.), Axmouth Saltings,

4.viii.2004, a species that has not been recorded for a few years. *Deltote uncula* (Cl.), Tavistock, 4.vi.2004, a rarely recorded species confirmed by description and drawing of the moth. *Tyta luctuosa* (D. & S.), Dundson Farm, near Holsworthy (NNR), 6.vi.2004, netted by John Gregory. *Phytometra viridaria* (Cl.), Whiteleigh Meadows, Hatherleigh, 22.v.2004. This rarely seen species was recorded by Rob Wolton, who has been responsible for most of the Hatherleigh based records of the aspen feeding species. *Hypena obsitalis* (Hb.), one of three specimens seen in the old army installation at Prawle Point on 1.ii.2004. (see *Entomologist's Rec. J.Var.*, **116**: 90, where it is stated that this is probably the first published record of the species being found overwintering in the wild in Great Britain). *Schrankia taenialis* (Hb.), this almost black specimen was taken at Teignmouth on 10.viii.2004.

Interesting species seen on a trip to the Lake District and Scotland in 2004. *Thera cognata* (Thunb.), taken at Cairngorm on 25.vii. 2004. *Xanthorhoe decoloraria decoloraria* (Esp.), Meall nan Tarmachan, Cairngorm and Duthill, 24 and 25.vii.2004; various forms including a banded variety. *Eustroma reticulatum* (D. & S.), an asymmetrical specimen taken on 23.vii.2004 at Lake Coniston, Cumbria. *Colostygia olivata* (D. & S.), Lake Coniston, 22 and 23.vii.2004. *Perizoma minorata* (Treit.) ssp. *ericetata* (Steph.), Cairngorm, 24.vii.2004. A few days earlier the moth was seen commonly, but only four were seen on this date along with *P. albulata* (D. & S.), which was abundant. *Selidosema brunnearia* (Vill.) ssp. *scandnaviaria* Staud.; Meathop Moss, 22.vii.2004, several seen during the day, mostly males.

OWEN, J.—All specimens from the garden at Eastbridge House, Dymchurch in Kent and taken at MV lamp. *Dysgonia algira* (L.), 1.viii.2004, possibly the seventh British record; *Cryphia algae* (F.), 9.viii.2004 and *Proxenus* [*Athetis*] *hospes* (Freyer), 18.viii.2004, believed to be the first Kent record and the most easterly so far. These three migrants, plus *Scopula immutata* (L.) were all new records of macros for the garden and bring the total to 490 since 1974. *Nola aerugula* (Hb.), 27.vi.2004 & 29.vii.2004. Several others were seen during the year. It has turned up in most years since the first record here in 1994 and the food plant, *Lotus corniculatus*, bird's-foot trefoil is plentiful in the garden. *Deltote bankiana* (F.), 26.vi.2004. This is another species which has appeared regularly in small numbers every year since 1989. There was a single record in 1977. *Pelosia muscerda* (Hufn.), 9.viii.2004 & 12.viii.2004. *Noctua janthina* (D. & S.), 12.vii, 17.vii & 18.vii.2004. Nearly all of the early *janthe*/*janthina* specimens were of this species.

PARSONS, M.S.—*Pelosia muscerda* (Hufn.), Walditch, Dorset, 8.viii.2004.

ROUSE, T.—*Cryphia algae* (F.), two of four specimens taken at Folkestone Warren 9.viii.2004 and 10.viii.2004. *Eupithecia phoeniceata* (Ramb.) taken at Folkestone Warren 22.viii.2004. *Xanthorhoe fluctuata* (L.), a specimen showing reduced black markings taken at Folkestone Warren 9.viii.2004. *Noctua janthina* (D. & S.), Folkestone Warren 11.viii.2004. *Rhizedra lutosa* (Hb.), Densole, Folkestone Kent 9.ix.2004 showing extensive black dusting to wings. *Noctua comes* Hb. ab. *sagittifer* Cockayne, Folkestone Warren, 20.vii.2004. This form is found commonly in the Isles of Scilly, Lundy and North Devon. *Arctia caja* (L.), Folkestone Warren, Kent 20.vii.2004, showing reduced hindwing spotting. *Euproctis similis* (Fuess.), Folkestone Warren, Kent 29.ix.2004; a possible second generation specimen. *Conistra ligula* (Esp.), Densole Folkestone Kent 19.x.2004; an aberrant specimen. *Cyclophora punctaria* (L.), Densole, Folkestone, Kent 4.ix.2004; a specimen showing extensive spotting on the wings. *Agrotis segetum* (D. & S.), Densole, Folkestone, Kent. 2.ix.2004, a melanic specimen.

SHERMAN, N. – All moths from Ipswich Golf Club. *Synanthedon vespiformis* (L.), found in a polytunnel on 20.vii.2004; *Pelosia muscerda* (Hufn.) 29.vii.2004 and *Proxenus* [*Athetis*] *hospes* (Freyer) 19.viii.2004.

SIMS, I. – *Heliothis armigera* (Hb.) to house lights 17.viii.2004, Earley, Reading, Berkshire.

THIRLWELL, I.R. – *Eublemma purpurina* (D. & S.) 16.viii.2004, Portsmouth, South Hampshire. One of two of this new British species recorded in Hampshire this year.

WEDD, D. – Specimens bred or captured in 2003–4. From Alderney. – *Euplagia quadripunctaria* (Poda); two examples of ab. *lutescens* Stldr. In Jersey and Guernsey this form represents about 5% of the population; in Alderney 30–40%. *Synansphecica muscaeformis* (Esp.); abundant everywhere in Alderney. *Zygaena trifolii* (Ver.); another abundant moth, which seems different from the various mainland subspecies. *Hadena luteago* (D. & S.) ssp. *barrettii* (Doubl.), two examples of the distinctive Channel Islands' form.

From Guernsey. – *Trachea atriplicis* (L.). The exhibitor has been breeding this species for three years; two specimens were of the typical green form; one was from a strain first shown last year in which the green is replaced by a purplish tinge; the other was a melanic ab. nov. which emerged in 2004.

From Jersey. – *Diacrisia sannio* (L.); examples showing the variation in colour (and size!) of the second and third broods, from Les Quennevais, Jersey. *Cyclophora ruficiliaria* (H.-S.); second and third broods of this recently identified species. The original pairing was from Waterworks Valley, Jersey, v.2004. *Coscinia cribraria* (L.); continuation of the breeding programme from last year. This form seems to be midway between ssp. *bivittata* South & *arenaria* Lempke; it is found only on the coastal sandhills of West Jersey and, new this year, Alderney. *Agrotis vestigialis* (Hufn.); a pair of the Channel Islands' form of this common species for comparison with *Agrotis graslini* (Ramb.), of which two males were exhibited of this recently discovered Channel Islands species (taken by R. Woods) from Le Braye, Jersey. *A. graslini* and *A. vestigialis* were both abundant in the Jersey sand-dunes in August 2004.

From Inis Meain, Aran Islands (western Ireland) – *Hadena perplexa* (D. & S.) ssp. *capsophila* (Dup.); two from a series bred from larvae found in vii.2003 which emerged v.2004. *Hadena caesia* (D. & S.) ssp. *mananii* (Gregs.); bred from a larva found on Inis Meain in vii.2003 and which emerged v.2004. This is a new locality for this species. From St Mary's, Isles of Scilly. – *Agrotis puta* (Hb.) ssp. *insula* (Rich.); specimens of the third brood, including a bilateral gynandromorph. Ova were obtained in viii/ix.2004 and the first moths in x.2004.

New or uncommon species from Henley-on-Thames, Oxfordshire – *Synanthedon andrenaeformis* (Lasp.); common on the Chilterns, but this one to pheromone in the exhibitor's Henley garden, a new record. *Xestia rhomboidea* (Esp.); to MV, a new Henley record

The Clearwing Moths of Dinton Pastures, Hurst, and California Park, Finchampstead, Berks. – A record of the eight species discovered by searching for larvae and pupae and use of pheromones for attracting the adults, plus a map of both parks, with sites indicated, and a series of photographs of those sites. Sites at Dinton Pastures – *Synanthedon tipuliformis* (Cl.), one site, High Chimneys, attracted to pheromone lures, plus other sites outside the Park. *Synanthedon vespiformis* (L.), two sites between Black and White Swan Lakes, attracted to pheromones. *Synanthedon myopaeformis* (Borkh.); one site in the cafe garden! A pupal case was found and pheromones were successful. *Synanthedon formicaeformis* (Esp.), many sites. It was most abundant near the Sailing Club and was attracted to pheromones and found as larvae and pupae. *Bembecia ichneumoniformis* (D. & S.), two sites at the edge of Black

Lake; to pheromones, also sites in California Park. *Sesia bembeciformis* (Hb.), larvae and pupae on Long Moor. *Synanthedon spheciformis* (D. & S.), several sites on Long Moor and Longmoor Bog. To pheromones in 2003 and 2004 and as pupae in 2004. *Synanthedon formicaeformis* (Esp.), several sites on the edge of Longmoor Bog, using pheromones. *Synanthedon culiciformis* (L.); one to pheromones at the edge of Long Moor.

WHEELER, K. – *Agrotis puta* (Hb.), an aberration from Fareham, Hants, 25.v.2004. *Rhinoprora* [*Pasiphila*] *rectangulata* (L.) 14.vi.2004, an aberration from Fareham, Hants.

WINOKUR, L. – A selection of moths from the London Zoo and BENHS Joint Field Meeting on 17.vii.2004 held in London Zoo. *Hypena rostralis* (L.) reared from a larva beaten from one of only two hop plants. *Apamea scolapacina* (Esp.), normally associated with larger areas of woodland habitat. *Idaea rusticata* (D. & S.). *Hoplodrina octogenaria* (Goeze)[*alsines* (Brahm)] showing its most consistent differences from *H. blanda* (D. & S.). *Eilema lurideola* (Zincken).

BRITISH MICROLEPIDOPTERA

AGASSIZ, D.J.L. & KIDDIE, R. – *Diasemia accalis* (Walk.), Gravesend, Kent, 24.v.2004, an adventive species new to Britain (Plate 2, Fig. 6). *Sciota adelphella* (F. v R.), Gravesend, 7.vi.2004, first West Kent (VC16) record. *Vitula biviella* (Zell.), Gravesend, 29.vi.2004 & 16.vii.2004. *Dioryctria sylvestrella* (Ratz.), Bedgebury Pinetum, Kent, 8.vi.2004, first West Kent (VC16) record.

BEAUMONT, H.E. – *Blastodacna atra* (Haw.), West Melton, Rotherham, South-West Yorks. (VC63), 30.vii.2004. There are only two previous Yorkshire records (one each from vice-counties 62 & 63) the last in 1922. *Eupoecilia ambiguella* (Hb.), Spurn NNR, South-East Yorks. (VC61), 7.viii.2004 (M.J. Coverdale leg.). The first Yorkshire record, this moth is local in southern England occurring in a single generation. Double brooded on the continent, the date of this specimen points to it being of immigrant origin. *Argyrotaenia ljungiana* (Thunb.), Strensall Common, York, North-East Yorks. (VC62), 20.vii.2004. Although double brooded in southern England this moth has hitherto only been recorded in a single generation in Yorkshire, occurring in May/early June. The present record suggests at least a partial second generation. *Eucosma catoptrana* (Rebel), Spurn NNR, South-East Yorks. (VC61), 25.v.2004 (B.R. Spence leg.), the first Yorkshire record. *Calamatrophra paludella* (Hübner), Old Moor wetlands reserve, Broomhill, South-West Yorks. (VC63), 7.viii.2004. The most westerly Yorkshire record, this moth is still very local in the extreme south of vice-counties 61 & 63 following the first Yorkshire record in 1995. *Duponchelia fovealis* (Dup.), West Melton, Rotherham, South-West Yorks. (VC63) indoors 5.iii.2004. The first Yorkshire record. *Endotricha flammealis* (D. & S.), Old Moor wetlands reserve, Broomhill, South-West Yorks. (VC63), 7.viii.2004. Following the first Yorkshire record in 1991 this moth has slowly spread westwards in the south of vice-counties 61 & 63, this is the most westerly to date. *Acrobasis consociella* (Hb.), West Melton, Rotherham, South-West Yorks. (VC63), 9.viii.2004, after an absence of almost a century this moth has re-appeared at several South Yorks. localities during the past few years. *Phycitodes maritima* (Tengst.), West Melton, Rotherham, South-West Yorks. (VC63), 9.viii.2004, there have been an increasing number of inland records in Yorkshire during the past few years. *Epiblema grandaevana* (Lien. & Zell.), Elveden Forest, West Suffolk (VC26), 11.vi.2004 (G. Finch leg.). A local moth nationally, this may be the first VC26 record. *Scythris potentillella* (Zell.), Lakenheath, West Suffolk (VC26), 13.vi.2004, numerous

amongst short turf. A very local moth whose distribution in Britain is restricted to East and West Suffolk. *Ephestia parasitella* Staud., Elveden Forest, West Suffolk (VC26), several 11–13.vi.2004.

BLAND, K.P. – *Enteucha acetosae* (Staint.), Alva Glen, Perthshire (VC87), occupied mines in *Rumex acetosa* collected 8.ix.2004, one moth emerged indoors 30.x.2004. Second Scottish site. *Stigmella pretiosa* (Heine.), Muchra Glen, Selkirks (VC79), occupied mines in *Geum rivale* collected 8.ix.2004 (originally recorded at this site in 1990s), some moths emerged 20–21.x.2004, others are overwintering; Kippenrair Glen, Stirlings (VC86), occupied mines in *Geum rivale* collected 23.x.2004, all overwintering as pupae. *Bryotropha boreella* (Dougl.), Red Moss, Midlothian (VC83), a female 25.vii.2004. The female, which has reduced wings, is rarely taken, this is only the second seen by the exhibitor. *Pammene luedersiana* (Sorh.), Drumcroy Hill, Perthshire (VC88), taken flying over *Calluna/Myrica* wet heathland in sunshine, 13.v.2004. Rarely taken due to its early occurrence. *Aphelia viburnana* (D. & S.), Fair Isle (VC112), a well marked female reared from *Salix repens*, larvae collected 29.v.2004, imago emerged 11.vi.2004. *Crambus pascuella* (L.) ab. *obscura*, Lyndhurst, Hampshire (VC11), flying with the typical form, 19.vi.2004. *Epinotia caprana* (F.), Inneshewan Wood, Perthshire (VC88), a diminutive specimen reared from larva on *Myrica gale* collected 27.vi.2004. Imago emerged 16.viii.2004, a few days after normal sized moths.

CLANCY, S. – *Monopis monachella* (Hb.), Minsmere, Suffolk, 26.vii.2004. *Cydia amplana* (Hübner), Dungeness area, Kent, four examples of at least seven in Kent during viii.2004, the first Kent records. *Haimbachia cicatricella* (Hb.), Lydd-on-Sea, one of each sex taken 3 & 5.viii.2004. All thirteen British records have been from East Kent, eight of these since 1999. *Eudonia mercurella* (L.), Barnham, Kent, a melanic banded example taken 4.viii.2004. *Diasemiopsis ramburialis* (Dup.), Lydd-on-Sea, Kent, 27.vii.2004, the second record from the area following the first at New Romney in 2003. *Dioryctria sylvestrella* (Ratz.), Dungeness, Kent, 21.vii.2004. *Pterophorus spilodactylus* (Curt.), Icklingham, Suffolk, 27.vii.2004.

CLIFTON, J. – Staffordshire moths including *Narycia monilifera* (Geoff.), Fradley Junction, 28.vii.2004, the only previous county record was in the 1930s. *Mompha sturnipennella* (Treits.), Fradley Junction, 28.vii.2004, the first Staffs record. *Pammene aurita* Raz., Wolseley Bridge, vii.2004, fourth county record; Fradley Junction, 28.vii.2004, fifth county record. *Pammene fasciana* (L.), Wolseley Bridge, 29.vii.2004, fifth county record. *Ectoedemia hannoverella* (Glitz.), Ipswich golf course, Suffolk (VC26), reared from mines on *Populus × canadensis* collected x.2003, new to Britain.

COLLINS, G.A. – *Elachista nobilella* Zell., White Downs, Dorking, Surrey, vi.2003, new to Britain, subsequently found at Hurt Wood, Peaslake, Surrey in 2004 by the exhibitor and J. Porter. *Cameraria ohridella* Desc. & Dim., Croham Hurst, south Croydon, Surrey, a horse chestnut leaf found a few days previously of which half the surface area was covered with larval mines. Although only some ten miles from the original British site there had been no sign of mines there until ix.2003, by autumn 2004 mines were quite common.

COOKE, R.R. – Pyralidae taken in 2004 including: *Crambus pratella* (L.), Granish, 3 & 4.vii.2004 and Lindisfarne, Northumberland. *Donacaula mucronellus* (D. & S.), Morden Bog, Dorset. *Mecyna asinalis* (Hb.), Durlston, Dorset, 29.vii.2004. *Dioryctria sylvestrella* (Ratz.), Trigon, Dorset, 28.vii.2004 with *D. abietella* (D. & S.), Durlston, Dorset, 29.vii.2004 for comparison.

DICKSON, R. – From Hampshire: *Evergestis extimalis* (Scop.), 2004. Some late season records of Scopariinae, *Eudonia pallida* (Curt.), this moth has increased

greatly during the past few years, latest record 16.ix.2004. *Dipleurina lacustrata* (Panz.), Fareham, 29.ix.2004. *Scoparia ambigua* (Treits.), Wickham Common, 6.xi.2004. *Agapeta zoegana* (L.) f. *fulvana* Haw., Wickham Common, 30.vii.2004, the only site where the exhibitor has encountered this form but six have been seen during the past two years leading to speculation that it is increasing.

DOBSON, A.H. – *Argyresthia trifasciata* Staud., Greywell, Hampshire 26.v.2004 (P.A. Boswell leg.) a new site in VC12. *Depressaria chaerophylli* Zell., Basingstoke, Hampshire, 5.iii.2004 (M. Wall leg.); Greywell, Hampshire, 29.ix.2004 (P.A. Boswell leg.), the first VC12 records. *Agonopterix pallorella* (Zell.), Tilshead, Wiltshire (VC8), 10.viii.2004. *Crambus silvella* (Hb.), Stodborough Heath Reserve, Dorset (VC9), a moth disturbed by day 31.vii.2004. *Phlyctaenia perlucidalis* (Hübner), Millfield, Old Basing, Hampshire (VC12), one of several flying at dusk 13.vi.2004, a new site. *Dioryctria sylvestrella* (Ratz.), Ladycross Inclosure, New Forest, Hampshire (VC11), 29.vi.2004, the first New Forest record.

ELLIOTT, B. – *Stigmella aceris* (Frey), Winchester, Hampshire, reared from mines on *Acer campestre*, these have been found commonly during the past two years, uncommon elsewhere in the area. *Elachista orstadii* Palm, Knockgranish, Inverness-shire, small numbers to MV light in early v.2004. *Elachista littoricola* Le March., Hurst Castle, south Hampshire, 2004. *Monochroa suffusella* (Dougl.), New Forest, Hampshire, common in boggy areas in early June. *Psoricoptera gibbosella* (Zell.), Chandlers Ford, Hampshire, frequent at MV light. *Anacampsis populella* (Cl.) f. *fuscatella* Bent., Formby, Lancs., reared ex. *Salix repens*. *Spuleria flavicaput* (Haw.), Chandlers Ford, Hampshire, flying abundantly around a *Crataegus laevigata* cultivar 'Paul's Scarlet'. *Acleris logiana* (Cl.), Knockgranish, Inverness-shire, a few at MV light in early v.2004, a search for larvae later in the year proved fruitless. *Acleris hastiana* (L.), Emer Bog, Hampshire, a reared series showing consistent facies. *Pammene trauniana* (D.&S.), St Catherine's Hill, Winchester, Hampshire, reared from a seed of *Acer campestre* collected 22.ix.2003. *Stenoptilia islandicus* (Staud.), Meall Nan Tarmachan, Inverness-shire, reared from larvae from two sites at an elevation of 750m, collected early v.2004.

EZARD, A.S. – Moths from Spurn NNR, South-East Yorkshire (VC61), *Pediasia aridella* (Thunb.), *Platytes alpinella* (Hb.), *Anerastia lotella* (Hübner), *Gymnancyla canella* (D.&S.) and *Agdistis benetii* (Curt.).

GIBBS, D.J. – *Epichnopterix retiella* (Newm.), Havergate Island RSPB Reserve, Suffolk, swept from shingle vegetation 17.v.2004. *Bedellia somnulentella* (Zell.), Staple Hill, Glos., mines in *Calystegia* collected 3.x.2004, adults emerged 17.x.2004. The last Gloucestershire record was in 1929. *Gypsonoma oppressana* (Treits.), Keynsham (playing fields), Somerset, swept from black poplar 28.vi.2004, the second Somerset record. *Dichrorampha alpinana* (Treits.), Blagdon Lake, North Bank, Somerset, in a flower rich meadow 5.vi.2004, the second Somerset record.

HARPER, M. – *Trifurcula beirnei* Pupl., Cother Wood, Malvern, Worcs., two female moths, 31.viii.2004 & 2.ix.2004, flying or crawling amongst low vegetation including *Genista tinctoria*, the possible foodplant. New to Worcestershire. *Triaxomasia caprimulgella* (Staint.), Ledbury Park, Herefords., in crack of bark of a veteran maple 17.vii.2004. There are few recent records, most being from south-eastern England and East Anglia. New to Herefordshire and West Midland counties. *Pammene suspectana* (Lien. & Zell.), Ledbury, Herefords., a male (gen. det.) to MV light, date not stated, new to Herefordshire. *Pammene ochsenheimeriana* (Lien. & Zell.), Cefn Hill, West Herefords., flying in daytime 24.vi.2002, new to Herefordshire and West Midland counties.

HECKFORD, R.J. – *Metralampyra italica* Bald., Plympton, Devon (VC3) at light 7.viii.2004. The second specimen of this species taken in the exhibitor's garden, the first on 16.viii.2003 was the first British record of a moth formerly believed to be endemic to Italy. *Bryotropha dryadella* (Zell.), near Gammon Head, South Devon (VC3), larva amongst unidentified moss 28.ii.2004, moth reared 13.iv.2004. *Scrobipalpa murinella* (Dup.), Monawilkin, Co. Fermanagh (H33), larvae mining *Antennaria dioica* 19.iv.2004, moths reared 2 & 6.viii.2004, new to Northern Ireland. *Brachmia blandella* (F.), Crownhill Down, South Devon, (VC3), larva in withered flower of *Ulex europaeus* 16.v.2004, moth reared 9.vi.2004. Possibly the first record of the larva being found feeding in the wild either in Britain or on the Continent. *Epinotia crenana* (Hb.), Cliffs of Magho, Co. Fermanagh, (H33), larva in spun leaf of *Salix aurita* 20.vi.2004, moth reared 31.vii.2004, new to Northern Ireland. *Crambus uliginosellus* Zell., Goss Moor, East Cornwall (VC2), one worn specimen, confirmed by dissection, 12.vi.2004, first confirmed Cornish record since 1906. *Catoptria margaritella* (D. & S.), Trowlesworthy Warren, South Devon (VC3), larva amongst *Campylopus flexuosus* 9.iv.2004, in captivity initially feeding on this and then on *Eriophorum angustifolium*, moth reared 25.v.2004. Possibly the first record of the larva being found in the wild either in the British Isles or on the Continent. *Duponchelia fovealis* Zell., Plymouth, South Devon (VC3), one inside office premises 14.xi.2003, new to Devon. *Merrifieldia tridactyla* (L.) (= *fuscolumbatus* (Dup.)), Rahugh Ridge, Co. Westmeath (H23), 18.vi.2004, confirmed by dissection, new to Co. Westmeath.

HEPPENSTALL, R.I. – *Ectoedemia decentella* (H.-S.), Rossington, Doncaster, South-West Yorks. (VC63), at MV light 7 & 8.vi.2004. *Ectoedemia argyropeza* (Zell.), Potteric Carr Nature Reserve, Doncaster, mines on hybrid grey leaved poplar, autumn 2003, moths emerged from 4.iii.2004. Previous Yorkshire records were in the 19th century. *Ectoedemia turbidella* (Zell.), Potteric Carr Nature Reserve, Doncaster, South-West Yorks. (VC63), mines on hybrid grey leaved poplar, autumn 2003, moths emerged from 8.iii.2004 (gen. det.) New to Yorkshire. *Ectoedemia subhimaculella* (Haw.), Potteric Carr Nature Reserve, Doncaster, reared 5.v.2004 from mines on oak. *Ectoedemia heringi* (Toll.), Potteric Carr Nature Reserve, Doncaster, reared 7.v.2004 from mine on oak, first VC63 record. *Trifurcula cryptella* (Staint.), Potteric Carr Nature Reserve, Doncaster, swept from *Lotus uliginosus* 16.v.2004 (gen. det.), first VC63 record. *Lampronia luzella* (Hb.), Potteric Carr Nature Reserve, Doncaster, 27.vi.2004, few Yorkshire records. *Heliozela hammoniella* (Sorh.), Potteric Carr Nature Reserve, Doncaster, swept from birches 25.v.2004, second VC63 record. *Phyllonorycter strigulatella* (Lien. & Zell.), Potteric Carr Nature Reserve, Doncaster, mines on *Alnus incana*, moths emerged from 18.ii.2004, second Yorkshire and first VC63 record. *Acrolepia autumnitella* Curt. Rossington, Doncaster, 7.viii.2004, the third Yorkshire locality. *Carpatolechia notatella* (Hb.), Potteric Carr Nature Reserve, Doncaster, reared 10.iv.2004, the third VC63 record. *Mompha terminella* (H. & W.), Potteric Carr Nature Reserve, Doncaster, reared 18.v.2004 from mine on *Circaea lutetiana*. Previous VC63 records were in the 19th century. *Mompha jurassicella* (Frey), Potteric Carr Nature Reserve, Doncaster, 13.iv.2004, first recorded at the site in 2000 and also in 2001. *Scythris inspersella* (Hb.), Bawtry Forest, Doncaster, South-West Yorks. (VC63), 17.vii.2004. The first VC63 record and only the second Yorkshire locality. *Cnephasia genitalana* P. & M., Potteric Carr Nature Reserve, Doncaster, reared 3.vii.2004 from flowerhead of *Leucanthemum vulgare*, second Yorkshire locality. *Acrobasis consociella* (Hb.), Potteric Carr Nature Reserve, Doncaster, reared 9.vi.2004 and subsequently from spinings on oak.

KNILL-JONES, S.A. – Microlepidoptera from Totland, Isle of Wight (VC10) including: *Crociosema plebejana* Zell., 10.vi.2004. *Cydia amplana* (Hb.), a small series taken 30.vii–21.viii.2004. *Evergestis extimalis* (Scop.), 5 & 9.ix.2004. *Phlyctaenia perlucidalis* (Hb.), 15.vi.2004. *Diasemiopsis ramburialis* (Dup.), 2.xi.2004.

LANGMAID, J.R. – *Caloptilia falconipennella* (Hb.) f. *oneratella* Zell., Hambledon, Surrey, reared from pupa on alder 8.vi.2004. *Argyresthia cupressella* Wals., Southsea, Hampshire, 4.vi.2004. *Monochroa arundinetella* (Staint.), Staverton, Wiltshire, 13.vii.2004. *Conobathra tumidana* (D. & S.), Southsea, Hampshire, 1.viii.2004. The *Eucosma hohenwartiana* group of species. An exhibit showing four each of the recently separated species: *E. hohenwartiana* (D. & S.) whose host plant is *Centaurea nigra*; *E. parvulana* (Wilk.) whose host plant is *Serratula tinctoria* and *E. fulvana* (Steph.) whose host plant is *Centaurea scabiosa*. Also a photograph of the female genitalia of each species showing the means of separation.

LOVE, S. & M. & DEWHURST, C. – From Ellanore Farm, West Wittering, Sussex (VC13): *Coleophora vibicella* (Hb.), viii.2004, the only remaining known British colony occurs on the other side of Chichester Harbour, effort will be made in 2005 to locate and search the foodplant (Dyer's Greenweed) in the West Wittering area. *Platytes alpinella* (Hb.), viii.2004. *Evergestis limbata* (L.), 15.vi.2004. *Sitochroa palealis* (D. & S.), 1.viii.2004. *Phlyctaenia perlucidalis* (Hb.), 14.vi.2004. *Pempelia genistella* (Dup.), viii.2004. *Dioryctria sylvestrella* (Ratz.), 2.viii.2004 and on a later unrecorded date that month, presumed primary immigrants. *Nephopteryx angustella* (Hb.), 2004. *Agdistis bennetii* (Curt.), recorded regularly viii.2004. *Sclerocoma acutellus* (Eversm.), Roman Landing, West Wittering 13.vi.2000, presumed to have been imported with reeds used to thatch a neighbouring roof. *Gymnancyla canella* (D. & S.), East Head, West Wittering, larvae on *Salsola kali* 7.x.2003, one adult reared 2004.

MCCORMICK, R.F. – Interesting moths from Devon in 2004 (the specimens exhibited were not necessarily the ones on which the records were based): *Ancylis laetana* (F.), recorded from two new sites in the Hatherleigh area. *Cydia amplana* (Hb.), Teignmouth, 9 & 13.viii.2004, two of several seen in the area and at other sites in Devon during the year. *Evergestis limbata* (L.), Kingsteignton, 15.vii.2004 (B. King leg.), new to Devon. *Evergestis pallidata* (Hufn.), Exminster Marshes, 23.vii.2004 (M. Young leg.) and Axmouth Saltings, 4.viii.2004. *Pyrausta cingulata* (L.), Braunton Burrows, 2.v.2004 and again in August (S. Hatch). *Eana osseana* (Scop.), Grey Knott, Cumbria, several of both striated and brown forms 22.vii.2004. *Crambus ericella* (Hb.), Grey Knott, Cumbria 22.vii.2004, the only one seen. *Crambus pratella* (L.), Bowerstone, Cumbria, 22.vii.2004. *Udea uliginosalis* (Steph.), Meall nan Tarmachan, Inverness-shire, males and females flying amongst grass.

OWEN, J. – Specimens from the exhibitor's garden at Dymchurch, Kent. *Nyctegretis lineana* (Scop.), 19.viii.2004, the first record from the site. *Loxostege sticticalis* (L.), a regular annual visitor in small numbers since 1994. An early specimen on 26.vi.2004 came to MV light but the species is more frequently seen in sunshine at flowers of *Sedum spectabile*. The larval foodplant, mugwort, is common in the garden.

PARSONS, M.S. – *Monochroa elongella* (Hein.), Tilshead, South Wiltshire (VC8), reared from larva on *Potentilla anserina* 26.iv.2004. *Monochroa hornigi* (Staud.), Shaggs, Dorset (VC9), 2.viii.2004, new to Dorset. *Teleiodes wagae* (Now.), Piddles Wood, Dorset, 22.v.2004. *Caryocolum vicinella* (Dougl.), Cogden Beach, Dorset, reared from larva 2.v.2004. *Cosmopterix pulchrimella* Chamb., West Bay, from larvae 17.i.2004. *Cydia amplana* (Hb.), Walditch, 2.viii.2004 (17 seen at the site between 2 & 18.viii.2004). *Catoptria margaritella* (D. & S.), Walditch, 23.vii.2004.

Uresiphita polygonalis (D. & S.), Walditch, 24.viii.2004. *Dichomeris ustulana* (F.), Shorn Cliff, W. Glos., (VC34), 3.vi.2004, new to Gloucestershire. *Aphelia unitana* (Hb.), Whitlaw Mosses, Roxburghshire (VC80), 18.vi.2004. *Pancalia schwarzeella* (F.), Conic Hill, Stirlingshire (VC86), 21.vi.2004. *Ancylys tineana* (Hübner), Coylumbridge, East Inverness-shire (VC96), 19.vi.2004 (also seen at Newtonmore, Inverness-shire, 21.vi.2004).

PORTER, J. – *Elachista nobilella* (Zell.), the first British specimen was caught at Westcott, Surrey on 5.vi.2003 by G.A. Collins. Exhibited specimens from a second locality, Hurt Wood, Surrey, where many were seen v–vi.2004. The habitat is totally different from the Westcott locality which is downland, this site being on the greensand ridge. *Bohemannia quadrimaculella* (Boh.), Weybridge, Surrey, 20.vii.2004 (A.R. Mitchell leg.), new to Surrey. *Mompha jurassicella* (Frey), South Croydon, Surrey, 31.iii.2003 and Chessington, Surrey, 22.ix.2004, new to Surrey. *Aethes beatriceella* Wals., Weybridge, Surrey, 14.vi.2004 (A.R. Mitchell leg.), new to Surrey. Moths scarce in Surrey: *Lampronia luzella* (Hb.), Ashted, 22.v.2004. *Proutia betulina* (Zell.), Malden Rushett, 24.iv.2004. *Leucoptera lotella* (Staint.), Hambledon, reared 8.vi.2004. *Elachista adscitella* (Staint.), Bookham, 7.vii.2004. *Mompha langiella* (Staint.), Bookham, reared 7.vii.2004. A selection of specimens of *Ypsolopha ustella* (Cl.) and *Epiphyas postvittana* (Walk.) from Surrey showing variation.

PRITCHARD, A.W. – *Ectoedemia hannoverella* (Glitz), reared from mines on *Populus × canadensis* from Mildenhall, Suffolk (VC26), 3.x.2003 and Ipswich, Suffolk (VC25), 7.xi.2003, new to Britain. *Gelechia muscosella* (Zell.), Belton, Suffolk (VC25), at MV light 16.vii.2004, new to Suffolk.

SIMPSON, A.N.B. – Notable Worcestershire (VC37) species: *Coleophora frischella* (L.), Great Malvern, 23.v.2004, six of many swept from, and apparently associated with, *Trifolium pratense* in an old meadow. *Coleophora alcyonipennella* (Koll.), Bransford, to MV light 16 & 26.viii.2004. These two species have been confused until recently, *frischella* has now been identified from three sites in VC37. All records are in May from old hay meadows or pastures, whilst *alcyonipennella* appears to be a recent arrival in VC37 with all records in August and early September 2003–04. *Nemophora cupriacella* (Hb.), Tiddesley Wood, 20.vii.2004. This moth has now been found at three sites in recent years but only females have been seen. *Stathmopoda pedella* (L.), Bransford, by River Teme, 14.vii.2004, new to Worcestershire, also recorded by River Stour, Worcs. by D. Scott in 2004 and possibly newly arrived in the county. An unknown tineid species reared 2003–04 from larvae in a jar of Chinese mushrooms believed to have been imported, and passed to the exhibitor by the purchaser. Exhibited on behalf of J.R. Rush: *Scythris limbella* (F.), Stoke Prior, at MV light 6.vi.2004, the first county record since 1871. *Cochylis molliculana* Zell., Hawford, 7.vi.2003, new to Worcestershire. *Cydia pactolana* (Zell.), Stoke Prior, at MV light 10.vi.2004, new to Worcestershire.

SIMS, I. – *Psychoides verhuella* Bru., adults and cases, Medmenham, Marlow, Bucks., larvae on *Phyllitis scolopendrium* in disused chalk quarry 1.v.2004, hatched 25.v.2004, new to VC24. *Psyche casta* (Pall.), males and cases (for comparison with *P. crassiorella*), Burnham Beeches, Slough., Bucks., cases on tree trunks 13.v.2004, hatched 25.v.2004. *Cameraria ochridella* Desch. & Dim., mines found on white flowered *Aesculus hippocastanum* at Hainault Forest, Chigwell Row, Essex (VC18), 8.ix.2004 and Blandford Forum, Dorset (VC9), 8.x.2004. Both are new to the respective vice-counties.

THIRWELL, I.R. – Moths from the exhibitor's garden MV trap in Portsmouth south Hampshire (VC11). *Coleophora vibicella* (Hb.), 5.viii.2004, several miles from its nearest larval foodplant, *Genista tinctoria*. *Cydia amplana* (Hb.), 8.viii.2004, one

of several in the county during viii.2004. *Oncocera semirubella* (Scop.), 18.vii.2004, likely to have wandered from known sites, mainly on chalk downland, in Hampshire and the Isle of Wight.

WEDD, D. – From Alderney, Channel Islands, 2003–04: *Oegoconia caradjai* P-G. & Câp., recorded at house lights but not at MV light. *Epischinia banksiella* Rich., the first Alderney record. *Schoenobius gigantella* (D. & S.), Henley-on-Thames, Oxfordshire, occasionally recorded by the Thames these two specimens were found fluttering over the exhibitor's tiny garden pond.

WINOKUR, L. – *Mecyna flavalis* (D. & S.) ssp. *flaviculalis* Carad., disturbed by day on set-aside land adjoining the junction of Shroner Wood main drive and the A33 Winchester to Basingstoke road (VC11), 28.vii.2004. A new Hampshire site, it supplements the seven known 2 × 2 km squares and sets a new eastern county limit. During the past 25 years this moth has suffered losses of its mainly southern coastal chalk downland habitat, in Hampshire its only stronghold is at Porton Down on the Wiltshire border.

WINOKUR, L. & PHILLIPS, R.K. – A selection of moths from the London Zoo and BENHS joint field meeting, the first ever insect recording event at London Zoo on 17.vii.2004, led by Paul Waring and hosted by the Zoo's plant curator, Kevin Frediani and invertebrates keeper Paul Pearce-Kelly. Species exhibited included: *Ostrinia nubilalis* (Hb.), *Conobathra repandana* (F.), *Euzophera pinguis* (Haw.) and *Myelois circumvoluta* (Geoff.).

FOREIGN LEPIDOPTERA

CRONIN, A.R. – A selection of butterflies and moths from San Pablo, Luzon, Philippines vii & viii.2004: *Pyrrhopyge cometes* Cramer, *Papilio polytes* L., *Papilio demodocus* Esp., *Doleschallia dascon* Godm. & Salv., *Precis almana* L. f. *asteria* L., *Hypolimnas bolina* L., *Melanitis leda* L. Three female lymantriids, two with wings, one wingless and a *Synemon* sp. (a 'clearwing') with black hairy larvae that eat dandelion-like weeds.

HALL, N.M. – Specimens collected in Spain or bred from Spanish stock. All collected with authorisations from the governments of the relevant Autonomous Communities: Basque Country, Aragon, Cataluña, Castilla y León and Andalucía.

(1) Andalucía: (a) Ronda, Málaga. The site comprised poplar, evergreen oak, good grassland, diverse vegetation and a permanent gushing spring which had cut a 5 metre deep V-shaped channel in the bottom of a wider gorge. (i) *Aporophyla chioleuca* H.-S., 20.x.2003. *Noctuidae Europaeae* Vol 5 states that "some decades ago it used to be abundant but due to intensive urbanization and agricultural land use it has become scarce and is now local... At present it should probably be regarded as an endangered species". (ii) An *Earias* sp., 2 & 3.vi.2004, thought to have come from *Populus* in the stream bed, matching specimens of *E. albovenosana* Ob. in the BMNH. For comparison: *E. clorana* L., Olonne sur Mer, Vendée, France, 10.vi.1984 & 31.vii.1994, *E. vernana* Hb., Ontiñena, Huesca, Spain, 4.vii.1991 & Olonne sur Mer, Vendée, France, 31.vii.1994 & 23.vii.1995. *Earias albovenosana* may be just a southern form of *E. vernana*, which feeds on *Populus*. (iii) *Cleonymia pectinicornis* Stdgr, 2.vi.2004. *Noctuidae Europaeae* Vol. 7 describes this as "local and usually rare". (iv) *Idaea manicaria* H.-S., two spring-generation females 2 & 3.vi.2004 and autumn generation males and females 16 & 17.ix.2004. Adults from these two generations were of very different sizes and (to N.M.H.) jizz. Both spring females laid fertile eggs, but all larvae died in an early instar for no obvious reason. The exhibitor had not recognised the species, but knew they were *Idaea* spp. because

they had only one pair of spurs on the hind tibiae. Referring to illustrations in Culot Vol 3 and to information in Redondo (*Los Geometridae de Aragón*, 1999) it seemed possible that they could be *I. manicaria* and this was later confirmed by comparing them with specimens in the BMNH. The spring generation matched *Idaea fatimata* Stdgr and the autumn generation *Idaea manicaria* H.-S., but these taxa have recently been synonymised. (v) *Synaphe diffidalis* Guen., 3.vi.2004, common in grassy areas and easily disturbed. (vi) A red form of *Mythimna sicula* Treit., 3.vi.2004. (vii) *Ctenophusia accentifera* Lefeb., 3.vi.2004. (viii) *Selidosema taeniolaria* Hb., 16.ix.2004, an unusual form. (ix) *Victrix microglossa* Ramb., 16.ix.2004. (b) Cala Bordonares, Mojácar, 24 & 25.v.2004: (i) *Characoma nilotica* Rogenhofer, 22.ix.2004 (not reported on the Spanish mainland until 1998). (ii) *Tathorhynchus exsiccata* Led., Mojácar, 25.v.2004. (iii) "*Semiothisa*" *pulinda* Walk., 25.v.2004. (iv) *Pandesma robusta* Walk., 24.v.2004 & 23.ix.2004. (v) *Ypsolopha trichonella* Mann, 25.v.2004. (vi) *Heliothis nubigera* H.-S., 22 & 24.v.2004. (vii) *Victrix microglossa* Ramb., 23.ix.2004. (c) Cabopino, Málaga, 18, 19 & 20.ix.2004: (i) *Mythimna languida* Walk. (Plate 2, Fig. 2) This looks unlike any other European wainscot (more like a *Discestra* sp.). It has only recently been reported from Spain and Portugal, and may be increasing in range. (ii) *Idaea saleri* Domínguez & Baixeras, 200 km west of its previously known distribution. The exhibitor has been fascinated by this little-known species for several years. It was first described in 1992 from El Saler in the Parque Natural Albufera, Valencia, Spain, but N.M.H. has now found it at eight different sites—three in Tarragona, two in Valencia, two in Almería, and (now) one in Málaga, and has extended the known distribution several times. Autumn generation specimens have been bred ex females from Tarragona, Valencia (including the type locality) and Almería, and currently larvae are being raised ex females from Málaga in the hope of successfully breeding a spring generation for the first time. Specimens from Almería and Málaga have darker abdomens than specimens from Valencia and Tarragona, which makes it more difficult to see the characteristic abdomen pattern, with black spots either side of a central line of the abdomen ground colour. (iii) *Spodoptera cilium* Guen. (iv) *Tephрина inconspicuaría* Hb., an unusual form. (d) Punta Umbria, Huelva, 3.ix.2002: "*Semiothisa*" *pulinda* Walk., previously exhibited in 2003 as a 'possible' *pulinda*. (e) El Pozo del Esparto, Almería, 24.ix.2004: (i) *Xanthodes albago* F. (ii) *Victrix microglossa* Ramb. (e) Puerto de los Blancos, Granada, 21.ix.2004: (i) *Luperina dumerilii* Dup. (ii) *Ocnogyna zoraida* Graslin. (f) Matalascañas, Huelva, 4 & 5.vi.2004: *Zobida bipuncta* Hb.

(2) Castilla y León: (a) Pradales, Segovia, 12.ix.2004: (i) *Agrotis obesa* Boisd., an aberrant form. (ii) *Scotochrosta pulla* D. & S. (iii) *Luperina nickerlii* Freyer. (b) Uzquiza, Burgos, 8.vi.2004: (i) *Hydriomena ruberata* Freyer. (ii) *Cyclophora serveti* Redondo & Gastón (to be confirmed). (iii) *Setina flavicans* Geyer (iv) *Paradrina selini* Boisd. (c) Los Cogotas, Ávila: (i) *Discestra gredosi* Laever, 13.ix.2004. (ii) *Antitype chi* L., 13.ix.2004. (iii) *Luperina dumerilii* Dup., 13.ix.2004. (iv) *Heliothis viriplaca* Hufn., 13.ix.2004. (v) *Phyllodesma suberifolia* Dup., 19.v.2004. (vi) *Copiphana olivina* H.-S., 7.vi.2004. (vii) *Conisania renati* Ob., 7.vi.2004. (viii) *Loxostege tessellalis* Guen. (ix) *Mutuaura terrealis* Treit. (d) Cebreros, Ávila, 20.v.2004: *Protorhoe corollaria* H.-S.

(3) Valencia, Albufera, 8.x.2003: *Idaea degeneraria* Mill., a red form, thought at the time of capture to be *I. rubraria* Stdgr.

(4) Basque Country: (a) Garaio, Alava: (i) *Phyllodesma suberifolia* Dup., 5.v.1999. (ii) *Phyllodesma kermesifolia* Lajonquière, 18.v.2004. (iii) *Luperina nickerlii* Freyer, 10 & 11.ix.2004.

- (5) Cataluña: (a) La Jonquera, Girona, 3.x.2003: *Phyllodesma suberifolia* Dup.
 (b) El Torn, Tarragona, 28.ix.2004: *Pachycnemia tibiaria* Ramb., to be confirmed.
 (6) Aragon: Santa Bárbara, Huesca, 28.vi.2001 & 23.v.2000: *Phyllodesma tremulifolia* Hb.

Bred specimens, mostly Sterrhinae: (i) *Watsonalla uncinula* Borkh. (Drepanidae) Mini Hollywood, Almería, ex female. Emerging 17–24.vii.2004, from parent 31.v.2004. Images were also shown of an *uncinula* larva (photography: Malcolm Storey). The ranges of *W. uncinula* and *W. binaria* overlap, *uncinula* occurs from the south of Spain up to at least mid France, whereas *binaria* occurs from England down to the Pyrenees and just across into northern Spain (de Freina & Witt, 1987). The larvae of *W. uncinula* have one hump on ring 3, where *binaria* have two. (ii) *Idaea belemia* Mill., spotted and unspotted forms from the same female, emerging 27.xi.2003 & 16.xii.2003, respectively. Parent 15.vi.2003, La Albufera, Valencia. Most larvae fed slowly over the winter. ?partially double-brooded (at least in captivity). (iii) *I. cervantaria* Mill., emerging 13–18.ii.2004, parent 12.x.2003, Cala Bordonares, Mojácar, Almería, possibly continuously brooded. (iv) *Scopula marginepunctata* Goeze, emerging 1–9.viii.2004, parent 7.vi.2004, Embalse de las Cogotas, Ávila, possibly multiple brooded. (v) *Idaea litigiosaria* Boisd, emerged iii.2004, parent 6.vi.2003, Biel, Zaragoza, possibly single brooded. (vi) *I. macilentaria* H.-S., emerging 26.iv.2004 & 17.v.2004, parent 20.vi.2003, Garaio, Alava, possibly single brooded. (vii) *I. alyssumata* Himm. & Mill., emerging 31.v. & 16.vi.2004, parent 5.x.2003, Bonastre, Tarragona, possibly double brooded. (viii) *I. degeneraria* Mill., a red form emerging 16.ii.2004 ex female taken Albufera, Valencia, 9.x.2003. (ix) *I. saleri* Domínguez & Baixeras, emerging 21.viii.–8.ix.2004, parent 23.v.2004, El Pozo del Esparto, Almería.

HARMAN, T.W. – Some exotic moths from Borneo, Thailand and Nepal. (1) Nepal: *Miniodes ornata* Moore, *Vamuna bipars* Moore, *Cyana bellissima* Moore, *Erebus albicincta* Koll., *Lagoptera junio* Dalm., *Catocala nivea kurosawai* Owada, *Areas imperialis* Koll., *Agleomorpha plagiata* Walk., *Alphaea impleta* Walk., *Thinopteryx crocoterata* Koll., *Krananda semihyalina* Moore, and *Polythlipta cerealis* Led. (2) Borneo: *Cyana perornata* Walk., *Dysphania discalis* Walk., *Tarsolepis rufobrunnea malayana* Nak., *Xyleutes strix* L., *Apsarasa radians* Walk., *Milionia basalis* Walk., *Macrocilix maia* Leech and *Plutodes argentilauta* Prout. (3) Thailand: *Eudocima salaminia* Cram., *Othreis hypermnestra* Stoll, *Phyllodes ustulata* Westw., *Phyllodes verhuelli* Voll., *Attatha regalis* Moore, *Tatargina picta* Walk., *Argina astrea* Drury, *Areas galactina* Van der H. and *Nevrina procopia* Cram.

McCORMICK, R.F. – Two weeks in Himmaros, north Greece, surveying the moths of Lake Kerkini Nature Reserve, near the Bulgarian border. The exhibitor was invited to run moth traps in an hitherto untrapped area (though Gordon Ramell, who lives at Himmaros had studied the butterflies). Five sites were surveyed with ultra-lightweight fully collapsible MV light traps that weighed 5 kilo each with the choke unit. All the MV bulbs survived the flight in the hold. He was surprised that so many species were common to Greece and the UK and was able to identify at least 50% of the species seen. Species that you expect to find only in coastal regions in the UK, such as *Eilema caniola* Hb., *Thetidia smaragdaria* F. and *Idaea degeneraria* Hb. could be found half way up a mountain in Greece. All the specimens brought back were pinned and most were set. The setting process was very short because of the very dry heat in Greece. Some specimens were attacked by small red ants while on the setting boards indoors. Anyone collecting in Greece should never leave boards of set specimens unprotected. The most common of all the moths were the catocalids: *Catocala eutychea* Treit. was as common as *Noctua pronuba* L. in the UK. On one

visit to a wetland habitat flies and small beetles gathered on the wetland side of the traps and half way through the night were at least three inches deep and could be scooped up by the handful.

The exhibitor was aware that some of his identifications may have been incorrect, as he had access to little modern literature on the European Lepidoptera. In the list that follows corrections pointed out at the Exhibition have been incorporated and an attempt has been made to update the names. The sites were Himmaros (HI, 9–26.vi.2004), where he stayed, just outside the main conservation area, Varonia (VA, 12.vi.2004)—a wetland site, Rupell (RU, 17.vi.2004)—a heathland/river site, and Belles (BE, 10.vi.2004) and Krousia (KR, 14 & 20.vi.2004)—both mountainside sites. The moths displayed not on the British list (or only recently added) were: *Synaphe moldavica* Esp., (HI). *Pyralis regalis* D. & S., (BE). *Oncocera combustella* H.-S., (HI). *Phycita meliella* Mann, (KR). *Ancylosis cinnamomella* Dup., (HI). *Xanthocrambus saxonellus* Zinck., (RU). *Epascestria pustulalis* Hb., (BE & VA). *Eurrhysis pollinalis* D. & S., (RU) 9.iv.2004. *Achyra nudalis* Hb., (HI & VA). *Ecpyrrhorhoe rubiginalis* Hb., (RU). *Harpadispas diffusalis* Guen., (RU). *Pleuroptya balteata* F., (KR). *Phyllodesma tremulifolia* Hb., (KR etc). *Odonestis pruni* L., (BE & HI). *Heliomata glarearia* D. & S., (KR). *Tephрина arenacearia* D. & S., (HI & VA). *Neognopharmia stevenaria* Boisd., (BE). *Eilicrinia trinotata* Metzner, (HI & KR). *Peribatodes umbraria* Hb., (BE). *P. correptaria* Zell., (KR). *Chlorissa cloraria* Hb., (BE etc.). *Eucrostes indigenata* Vill., (RU). *Idaea rufaria* Hb., (BE & KR). *I. moniliata* D. & S., (RU). *I. elongaria* Ramb., (HI & RU). *I. politaria* Hb., (HI). *I. ostrinaria* Hb., (KR). *I. deversaria* H.-S., (RU). *Rhodostrophia calabra* Petagna, (HI). *Catarhoe permixtaria* H.-S., (KR). *Eupithecia breviculata* Donzel, (HI & KR). *Paradrymonia vittata* Stdgr, (VA). *Spatalia argentina* D. & S., (HI). *Catocala nymphaea* Esp., (KR, VA etc.). *C. eutychea* Treit., (BE, HI & KR). *Grammodes bifasciata* Petagna, (HI). *Aedia funesta* Esp., (HI etc.). *Gonospileia triquetra* D. & S., (RU) 9.iv.2004. *Eutelia adoratrix* Stdgr, (BE, KR & RU). *Acontia urania* Frivaldszky, (KR & RU). *Phyllophila obliterata* Ramb., (HI, KR & VA). *Eublemma purpurina* D. & S., (BE). *Chazaria incarnata* Freyer, (HI). *Platyperigea kadenii* Freyer, (HI?). *Atypha pulmonaris* Esp. and *Actinotia hyperici* D. & S., (BE, KR & RU). *Callopietria latreillei* Dup., (HI & KR). *Cosmia confinis* H.-S., (HI etc.). *Hadena magnolii* Boisd., (KR). *Mythimna congrua* Hb., (BE). *Mythimna sicula* Treit., (KR & RU). *Parocneria terebinthi* Freyer, (KR & RU). *Dysauxes punctata* F., (HI & KR).

PICKLES, A.J. & HARMER, A.S.—Some moths from Lapland listed here in systematic order following Karsholt & Razowski (1996). Of the localities visited five were in Torne Lappmark, Sweden: (i) Jukkasjärvi (1–11.vii.2004), (ii) Kalixfors, Kiruna (2.vii.2004), (iii) Krotvik, Kiruna (8.vii.2004), (iv) Low hills south of Abisco (5.vii.2004) & (v) Mt Njulla, Abisco (7.vii.2004), three were in Norrbotten, Sweden: (i) Overkalix, Landsviksudden (1.vii.2004), (ii) 5 km north of Talvik (12.vii.2004) & (iii) near Person (12.vii.2004) and two were in Troms Indre, Norway: (i) Mountains 5 km south of Gargia (9.vii.2004) & (ii) 10 km west of Alta (9.vii.2004).

Zygaena exulans (Hohen.) ssp. *vanadis* Dalm., Gargia. The subspecies from Lapland appears larger and brighter than the British ssp. *subochracea* White. The exhibitors only encountered this subspecies on limestone hills above 800 m, where it was frequent, but were told that it is usually abundant in lowland tundra as well. (ii) *Synanthedon polaris* (Stdgr), Krotvik. This clearwing was attracted to pheromones intended for *Plusia* spp., recorded in wet bogs where *Salix lapponum* was present. (iii) *Polopeustis altensis* (Wocke), Abisco. This pyralid had colonised areas of loose chippings on the edges of roads and the railway near Abisco. (iv) *Gesneria centuriella* (D. & S.), Alta. A large scopariine species occurring both in



PLATE 1. BENHS Annual Exhibition. Imperial College. 13 November 2004

1: *Argynnis aglaja* ab. *pallida*, 13.vii.2004, northern England, P. Tebbutt. 2: *Aglais urticae ichneusa*, temperature shock, K. Bailey. 3: *Maniola jurtina* ab. *nov.*, (unicolorous hindwings), Dorset, viii.2004, R. Barrington. 4: *Colias croceus* ab. *nigrofasciata*, male, temperature shock (pupa), P. Tebbutt. 5 & 6: *Polyommatus coridon* x *P. bellargus* hybrid, 'polonus', North Downs, 13.vi.2004, A.M. Jones. 7: *Polyommatus coridon* ab. *radiata*, male, Wiltshire, 2004, D.A. Humphrey. 8: *Polyommatus bellargus*, melanica male, Dorset, vi.2004, R. Barrington. 9: *Lycaena phlaeas* forewing homoeosis, bred, Surrey, 8.xi.2004, A.M. Jones. 10: *Lycaena phlaeas* ab. *melanophlaeas*, temperature shock, A. Butler. 11: *Lycaena phlaeas* ab. *radiata*, temperature shock, A. Butler.

All illustrations are near life size unless otherwise stated. Photographs by Richard A. Jones.



PLATE 2. BENHS Annual Exhibition. Imperial College. 13 November 2004

1: *Agrochola helvola*, Balgowan Highlands Scotland, 1.ix.1004, A. Kolaj. 2: *Mythimna languida*, Dunas de Capopino, Malaga, 18.ix.2004, N.M. Hall. 3: *Xestia quieta*, Gargia, Norway, 9.vii.2004, A.J. Pickles & A.S. Harmer. 4: *Aeolarcha eaphthalma*, Hong Kong, M. Sterling. 5: *Callimorpha dominula* ab. *bimaculata*, Merseyside, vi.2004, A.R. Cronin. 6: *Diasemia accalis*, Gravesend, Kent, D.J.L. Agassiz, 2 x life size. 7: *Thera cupressata*, Totland, Isle of Wight, 27.vi.2004, S. Knill-Jones. 8: *Crocallis elinguaris*, Teignmouth, Devon, 8.vii.2004, R.F. McCormick. 9: *Zygaena lonicerae*, Combrook, Warks., 20.vi.2004, D. Brown. 10: *Timandra comae*, Wembury near Plymouth, Devon, 27.vii.2004, R.F. McCormick (captor P. Stubbs). 11: *Cicada orni*, Tunbridge Wells, Kent, 2004, A. Stewart. 12: *Thisizima* species, Hong Kong, M. Sterling, 2 x life size. 13: *Rhagio notatus*, Savernake Forest, Wilts., 30.v.2004, A.J. Halstead, 1.75 x life size.

All illustrations are near life size unless otherwise stated. Photographs by Richard A. Jones.

boreal lowland bogs and mountains. (v) *Udea inquinatalis* (Lien. & Zell.), Kalixfors, a species with a wide distribution in Scandinavia, frequent at Jukkasjärvi. (vi) *Cosmotriche lobulina* (D. & S.) ssp. *junia* Saarenmaa, Jukkasjärvi, 5.vii.2004. They were surprised to encounter this species so far north. It flew high, straight and fast at about midnight and two were taken. (vii) *Falcaria lacertinaria* (L.), Jukkasjärvi, 1.vii.2004. This occurred commonly in a large single generation form in the woods at Jukkasjärvi, where it presumably feeds on *Betula nana* which forms the understorey beneath 'Bottlebrush' Spruce. The spruce in certain areas of Lapland is stunted to no more than 10 metres in height and has reduced growth of branches because of the extremely poor growing conditions. Apparently many of the small spruces at Jukkasjärvi are 300 years old. The timber is dense as a result and hence valuable. There has been some recent felling and it is possible to see environmental problems even in this remote wilderness. (viii) *Pygmaena fusca* (Thunb.), Gargia, a montane species which flies together with *Glacies coracina* Esp. (ix) *Parietaria vittaria* (Thunb.), Jukkasjärvi, 1.vii.2004, found flying slowly through woodland at mid height in the early evening. (x) *Glacies coracina* (Esp.), Gargia, frequent on limestone hills where it displays a seemingly greater range of variation than in Scotland. (xi) *Xanthorhoe abrasaria* (H.-S.), Jukkasjärvi, 3.vii.2004 and Mt Njulla. This was found frequently in bogs and wet, open woodland. (xii) *Xanthorhoe decoloraria* (Esp.), Gargia and Talvik. It was noticeable that the form encountered was more like that from Scotland than either ssp. *hethlandica* Prout or ssp. *arcticaria* Keferstein which the exhibitors had previously seen from Iceland. (xiii) *Xanthorhoe montanata* (D. & S.) f. *lapponica* Stdgr, Jukkasjärvi, 1.vii.2004. Specimens seen in woodland at Jukkasjärvi were presumably referable to *lapponica* Stdgr but closely resembled ssp. *shetlandica* Weir. (xiv) *Xanthorhoe annotinata* (Zett.), Jukkasjärvi, 2.vii.2004 and Mt Njulla, a northern carpet moth from wet tundra bogs. (xv) *Chloroclysta infusata* (Tengst.), Jukkasjärvi, 11.vii.2004, superficially resembling *C. truncata* (Hufn.) (xvi) *Thera serraria* (Lien. & Zell.), Jukkasjärvi, 5.vii.2004, seen flying high but very slowly. The larvae feed on the stunted spruce. (xvii) *Rheumaptera hastata* (L.), Jukkasjärvi, 2.vii.2004 and Kalixfors. The form found in Lapland resembles that from our southern oak woods rather than ssp. *nigrescens* Prout from Scotland. (xviii) *Rheumaptera subhastata* (Nolken), Kalixfors and Jukkasjärvi, 7.vii.2004. Encountered commonly in the woods at Jukkasjärvi, wet and dry bogs round Kiruna and in the mountains at Abisko. (xix) *Psychophora sabini* Kirby, Gargia. This species is seldom seen below 1000 metres and was only found in the Norwegian mountains. (xx) *Polypogon tentacularia* (L.), Jukkasjärvi, 2.vii.2004, the commonest species encountered, found in every locality visited. (xxi) *Autographa macrogamma* (Eversm.), Person, 12.vii.2004, associated with lowland flowery meadows in northern Scandinavia. (xxii) *Syngrapha microgamma* (Hb.), Overkalix, a lowland species which visits the flowers of *Ledum* in particular. (xxiii) *Syngrapha parilis* (Hb.), Gargia. A plusiine of high mountains, where it flies with its rarer congener, *Syngrapha hohenwarthi* (Hochenwarth). (xxiv) *Sympistis heliophila* (Paykull), Kalixfors. A beautiful little cuculliine, ubiquitous in Lapland, seemingly on the wing 24 hours a day. However it flies mostly in sunshine when it darts around close to the ground like the hadenids it resembles. (xxv) *Hadula melanopa melanopa* (Thunb.), Krotvik. Represented in Britain by ssp. *brunnea* Tutt, a form with cleaner white hindwings and paler forewing ground colour. (xxvi) *Coranarta cordigera* (Thunb.), Krotvik. Although no name seems to separate the Lapp and Scottish forms the Lapp specimens seem larger and cleaner. They were found in low bogs feeding on *Ledum*. (xxvii) *Lastionycta secedens* (Walk.), Krotvik. At night this species flew very high and fast at Jukkasjärvi where an occasional flash of yellow betrayed its

presence, but it proved impossible to catch in these conditions. During the day however it visited *Ledum*. (xxviii) *Lasionycta skraelingia* (H.-S.), Jukkasjärvi, 3 & 5.vii.2004. The 'High Flyer' to beat them all, appearing between 22.00–02.00h when it could be seen commonly as a black blob zig-zagging at tree top height at tremendous speed. Securing them was tremendous sport and involved standing between clumps of Bottlebrush spruce waiting for one to dash wildly across the open space and flailing equally wildly with a net on a four metre pole! (xxix) *Xestia quieta* (Hb.), Gargia. The first of the *Xestias* for which the area is famous. This is a mountain species found above 800 metres in barren, rocky terrain and is restricted to the extreme north of Scandinavia. One of the specimens was a particularly striking black form (Plate 2, Fig. 3). (xxx) *Xestia speciosa* (Hb.) ssp. *arctica* (Zett.), Jukkasjärvi, 1 & 5.vii.2004, one of two subspecies occurring in Scandinavia. (xxxi) *Xestia borealis* (Nordström), Jukkasjärvi, 5.vii.2004. A Jukkasjärvi speciality that flies very high but slowly around midnight. (xxxii) *Xestia laetabilis* (Zett.), Jukkasjärvi, 11.vii.2004. This flies in the woods at Jukkasjärvi quite slowly and at head height and is comparatively easy to catch. (xxxiii) *Xestia distensa* (Eversm.) Jukkasjärvi, 11.vii.2004. Although *distensa* was first named in 1851 it was then confused once more with *laetabilis* and not re-separated until recently. Although the two moths are extremely similar in appearance they fly in a subtly different way, with *distensa* displaying marginally more 'attack' to its flight and frequenting slightly damper and lower parts of the woods. (xxxiv) *Xestia gelida* (Sparre-Schneider), Jukkasjärvi, 5.vii.2004. This moth was the first for which Jukkasjärvi became well known and flies fast at medium height through the woods. Later in the emergence period it frequently appears at wine baits. (xxxv) *Xestia alpicola alpicola* (Zett.), Jukkasjärvi, 5.vii.2004. Very different from our ssp. *alpina* (Humph. & Westw.), behaving in a similar way to *gelida*. (xxxvi) *Xestia tecta* (Hb.), Jukkasjärvi, 11.vii.2004. Another woodland species flying low and quite slowly at Jukkasjärvi. (xxxvii) *Phragmatobia fuliginosa* (L.) ssp. *borealis* Stdgr, Jukkasjärvi, 5.vii.2004. The same form as from north Scotland and the Northern Isles—very distinct from our usual English form.

PLANT, C.W.—A selection of moths from eastern Europe (Slovakia & Hungary), 2004: (1) Sirok (Heves), Hungary, MV, 19.viii.2004. *Quercus petraea* dominated woodland and associated *Salix* dominated marsh with *Sphagnum*: (i) *Thetidia smaragdaria* (F.) (2) Sár Hegy (Heves), Hungary, MV, 20.viii.2004. Dry, steeply sloping volcanic hillside with xerophilic vegetation at 510 metres above sea level: (i) *Calamia tridens* Hufn. (ii) *Calymma communimacula* (D.&S.) (iii) *Cucullia xeranthemi* Boisd. (iv) *C. dracunculi* Hb. (v) *Tethea ocularis* (L.) (vi) *Amphipyra livida* (D.&S.) (3) Senyő Valley (Borsod), Hungary, MV, 18.viii.2004. Edge of mature beech forest, with pedunculate oaks and other broad leaved species, at 490 metres above sea level: (i) *Eustroma reticulatum* (D.&S.) (4) Mikulásov (Malacky Bratislavsky), Slovakia, MV, 17.viii.2004. Ride with deciduous trees through pine plantation on sand. (i) *Coscinia cribraria* (L.) (ii) *Emmelia trabealis* (Scop.) (5) Priesmyk Branisko (Levoca, Presovsky Kraj), Slovakia, MV, 15.viii.2004. Mixed broad leaved and deciduous woodland at 692 metres altitude. (i) *Amphipyra perflua* (F.) (ii) *Catocala fulminea* (Scop.)

SIMS, I.R.—Foreign lepidoptera, all Psychidae except for *Phereoeca uterella* Walsingham which is a tineid despite being called the "Plaster bagworm". From material provided or collected by Uwe Widowski (UW), Thomas Sobczyk (TS), Reinhard Maschler (RM), Gaden S. Robinson (GSR), Brian Freeman (BF) and Don Herbison-Evans (DHE): (i) *Psyche crassiorella* (Bru.), male and case, Rheinland-Pfalz, Saarburg, Germany, 16.v.2000 (UW). (ii) *Canephora hirsuta* (Poda), male and

case, Hansestadt, Boberg, Hamburg, Germany, collected by TS 25.v.2000, hatched 15.vi.2000, via UW. (iii) *Psilophaea plumifera* (Ochsen.), male, Hansestadt, Boberg, Hamburg, Germany, 1.v.2001 (RW). (iv) *Megalophanes viciella* (D. & S.), male and case, Croatia, collected by TS 12.vi.2000, via RM. (v) *Megalophanes stetinensis* (Hering), male, female and cases, Rathenow, Brandenburg, Germany, 25.vi.1999 (RM). (vi) *Megalophanes stetinensis* f. *viadrina*, male, female and cases, Mecklenburg-Vorpommern, Anklam, Stadtbruch, Germany, 29.iii.1998 (RM). (vii) *Phalacropterix grasilinella* (Boisd.), male and case, Niederrohe, Lower Saxony, Germany, 17.v.2002 (UW). (viii) *Apterona helicoidella* (Vallot), cases, Luneburg, Lower Saxony, Germany, 27.viii.2000 (UW). Parthenogenetic. (ix) *Thyridopteryx ephemeriformis* (Haw.), adults and cases. F₁ generation, ex larvae. Lake of the Ozarks, Laurie, Missouri, North America. Larvae hatched 10.iii.2003, reared on *Thuja orientalis* (first instar) and *Cupressocyparis leylandii* (subsequent instars). Cases fixed prior to pupation mid vi.–mid vii.2003. Males (29) hatched 1–27.viii.2003 (mostly around 16.30h). Females (29) emerged 16.viii–9.ix.2003 (mostly during the early morning). Cases collected by GSR 19.xi.2002. (x) *Oiketicus kirbyi* Guilding, female and case, Campus of the University of the West Indies, Kingston, Jamaica. Found as large larva by BF on unknown species of conifer, 22.i.2002. Reared on *Thuja orientalis*, case fixed 21.iv.2002, hatched 9.vi.2002. (xi) *Cebysa leucotelus* Walk., female and case, Concord, Sydney, New South Wales, Australia, collected by DHE 20.x.2003. Fed on various spp. of lichens, fixed case early i.2004, pupated 15.i.2004, hatched 1–6.iv.2004. (xii) *Metura elongatus* (Saunders), male, female and cases, Concord, Sydney, New South Wales, Australia, collected by DHE 25.iv.2004. Fed on *Photinia glabra*. Male fixed case 10.v.2004, hatched 18.ix.2004. Female fixed case 19.viii.2004, hatched 13.x.2004. (xiii) *Phereoeca uterella* Walsingham, adults and cases, Four Seasons Hotel, Kingston, Jamaica, West Indies. Collected as larvae on exterior walls 20.i.2002, male hatched 26.i.2002, female hatched 20.ii.2002.

STERLING, M.J. – (1) The Wainscots of Hong Kong, collected 1998–2004. There are 30 species of *Mythimna* recorded from Hong Kong of which 22 were exhibited. This range appears at first sight remarkable as Hong Kong has comparatively little grass. The foreshores of the harbour and the lowlands in the New Territories, which used to be paddy fields, are largely built up or agricultural and the grassland species are not very diverse. Most of the hillsides are heavily wooded with dense submontane rainforest. Grassland species tend to be restricted to path edges, clearings and the banks of streams, but diversity is high. Probably the best expanses of grassland occurs on the higher slopes of the hills where the rainforest gives way to scrub dominated by *Rhodomyrtus* and *Melastoma* and on coastal cliffs. The other extensive area of grassland is centred on the mangrove which occurs around the old fishponds at Mai Po. The exhibitor has not worked either the fishponds or the hilltops and it is likely that further species of *Mythimna* remain to be discovered in Hong Kong. Some identifications were tentative or provisional. No genitalia have been examined yet: (i) *Mythimna distincta* (Moore), a few specimens at 340 m and 550 m (ii) *M. consanguis* (Guen.), common in the car park under the exhibitor's flat (on the coast) but also found elsewhere. (iii) *M. compta* (Moore), also found principally in the car park under the flat. (iv) *M. celebensis* (Tams), mostly at 340 m and Kadoorie, but a few on the coast. (v) *M. fasciata* (Moore), six specimens at 550 m at Kadoorie. (vi) *M. reversa* (Moore), a common species. The sexual dimorphism of this species is unusual for a Wainscot. (vii) *M. radiata* (Bremer), fairly common. (viii) *M. macellaroides* Poole, a few specimens at 340 m at Kadoorie. This and the next species are figured as conspecific in Haruta, *Moths of Nepal*, though this is unlikely based on physical appearance. (ix) *M. roseorufa* (Joannis), the only two

specimens seen. Taken at 186 m and 340 m at Kadoorie. Not previously recorded from Hong Kong. (x) *M. decississima* Walk., widely distributed but not common. (xi) *M. loreyi* (Dup.), scarce in lowland areas of the New Territories. (xii) *Mythimna polysticha* Turner. Kendrick (in prep) suggests that *polysticha* is an Australian species so the identity of the specimens needs verification. A few specimens at 340 m at Kadoorie. (xiii) *M. tangala* (Feld. & Rogenh.), scarce, but found in the lowlands in the New Territories and at 340 m at Kadoorie. (xiv) *M. formosana* (Butler), fairly common. Darker than illustrated specimens of *formosana*, though worn specimens are much paler. (xv) *Mythimna* nr. *taiwana* (Wileman), fairly common. The underside had iridescent metallic scaling (*M. decississima* has similar scaling). (xvi) *M. tricorna* (Hreblay *et al.*), fairly common and widespread although not found on the coast. (xvii) *M. insularis* (Butler), the only two specimens seen, both taken at 550 m. (xviii) *M. formosicola* (Yoshimatsu). The *formosicola* group are difficult to tell apart, these were taken at 340 m and Kadoorie. (xix) *Mythimna* sp. A nr *formosicola*, the commonest *formosicola* group species in the lowlands. (xx) *Mythimna* sp. B nr *formosicola*. A specimen according to Kendrick's nr. *formosicola* sp. B – but further work is necessary to determine whether it is a good species. (xxi) *M. yu* (Guen.), a fairly common species. (xxii) *Mythimna* sp. (xxiii) *Sesamia* nr. *uniformis* (Dudgeon) The identity needs checking. (xxiv) *Nonagria nigropunctata* (Wileman), fairly common at 186 m.

(2) *Spodoptera picta* (Guérin) from Hong Kong. Bred from *Crinum* (Liliaceae). Exhibited as an example of what can happen to the genus *Spodoptera* outside temperate Europe.

(3) Microlepidoptera of Hong Kong, 1998–2004.

(i) Psychidae: A psychid sp. taken at light on the summit of Kwun Yam Shan at 550 m. (ii) Tineidae: *Thisizima* sp. Seven species of *Thisizima* are known to occur in Asia, all characterised by their extraordinary antennae. The species exhibited (Plate 2, Fig. 12) is fairly common at Kadoorie at 186 m but is probably undescribed. (iii) Gracillariidae: *Porphyrosela dorinda* (Meyrick), very small and almost impossible to set. The larvae make conspicuous white blotch mines in *Desmodium heterocarpum* (Fabaceae). (iv) Choreutidae: *Brenthia* sp., probably undescribed, bred from various species of *Ficus*. *Brenthia* species are unusual in having a colour pattern almost as well developed on the underside as on the upperside. Species similar to the one displayed have been described from Japan, and occur in Taiwan. (v) Brachodidae: *Phycodes minor* (Moore), new to Hong Kong. The larvae spin the terminal leaves and fruits of *Ficus simplicissima*. Commonest near the coast but also occurs at Kadoorie. (vi) Oecophoridae: (a) *Neospastis sinensis* Bradley. The type series is described as being bred from tea leaves from Tai Mo Shan. It is also fairly common at night at Kadoorie which suggests it feeds on other Theaceae. Endemic to Hong Kong. (b) *Aeolarcha eaphthalma* Meyrick. (Plate 2, Fig. 4). This or a similar species is a minor pest of tea in Taiwan (Yen, pers. com.). There are however only two specimens in the BMNH collection, Meyrick's type which is a shattered stump and a fresh specimen deposited by Kendrick. (vii) Gelechiidae: *Anarsia patulella* (Walk.), a common tropical species which is also the commonest *Anarsia* in Hong Kong. Identity confirmed this year. (viii) Immidae: *Imma* sp., bred from *Schefflera octophylla*. The larvae are gregarious and skeletonise the lower surface of the leaves. A common species on Hong Kong island but does not obviously match a described species. (ix) Pyralidae: *Coenodomus* sp. Well known from Hong Kong but undescribed. It is much brighter green when first taken but fades after a couple of years. (x) Crambidae: (a) *Aethaloessa calidialis* (Guen.), first recorded from Hong Kong in 2001. Widely distributed in the old world tropics and apparently also known

from Africa (Cameroon). (b) *Trychophyesetis problematica* (F.) There are records of this species from Hong Kong and Japan. (c) *Heortia vitissoides* (Moore), Hong Kong's commonest pyralid. It is not uncommon to find over 1000 individuals attracted to a single MV light. (d) *Omphisa anastomasalis* (Guen.), one of the more spectacular pyralids. Apparently scarce in Hong Kong, but recorded from Australia to America in the tropics. (xi) Alucitidae: *Alucita flavofascia* (Inoue), the only known records for China.

WARING, P.M. – Southern *Catocala* moths (Noctuidae) in Kentucky and Illinois, USA, 29.vii–5.viii.2004. About 110 species have been recorded in North America, and in 2004 the exhibitor fulfilled a long held ambition to visit America to study them. A full account will be published soon in the *Bulletin of the Amateur Entomologists' Society*. P.M.W. saw at least sixteen species, of which eight were displayed chosen to illustrate some of the diverse forms that have evolved. Accompanying photographs showed some of the Kentucky lepidopterists he met, the sites visited and the techniques used. Permission for *bona fide* moth recording in the US was straightforward to arrange by working through local recorders and making arrangements in advance. He recommends joining the Lepidopterists' Society (of America) before going. He took a small transformer to be able to use his British appliances from 110V supplies—including mains power points at recognised camping sites. There were no problems bringing pinned material back to the UK for setting, confirmation and reporting. From Otter Creek Park, Jefferson Co., Kentucky: (i) *Catocala amatrix* (Hb.) f. *selecta*, 30.vii.2004. (ii) *C. palaeogama* Guen., 29.vii.2004. (iii) *C. nebulosa* Edw., 31.vii.2004. (iv) *C. serena* Edw., 31.vii.2004. (v) *C. judith* Stkr., 31.vii.2004. From Cross of Peace, Bald Knob, Union Co., Illinois: (i) *C. ilia* (Cram.), 3.viii.2004. (ii) *Euparthenos nubilis* (Hb.), 3.viii.2004. From War Bluff, Shawnee Nat. Forest, Pope Co., Illinois: (i) *C. vidua* (J.E. Smith), 2.viii.2004.

WINOKUR, L. – *Anthocharis damone* Bsdv. (Pieridae), females: one typical, and one a possible new aberration with grey-dusted upper forewing 'tips' and 'pin-point' upper hindwing discoidal spot. Emerged 31.iii & 4.iv.2004 respectively from pupae of Sicilian stock purchased from Nigel South of Chard, Somerset, 28.iii.2004 and maintained indoors at 16–21°C.

DIPTERA

ALEXANDER, K.N.A. – Three species from historic parkland sites in Derbyshire (VC 57) in 2004. *Solva marginata* (Meig.) (Xylomyidae), Hardwick Park (SK46), one on collapsed tree of *Aesculus hippocastanum*, 19.vii; *Acrocera orbiculus* (F.) (Acroceridae), Calke Park (SK32), one swept from dry acid grassland, 28.vi; *Pocota personata* (Harris) (Syrphidae), Kedleston Park (SK34), one at moist white heart-rot of a split trunk of *Aesculus hippocastanum*, 18.v and another in Calke Park, at wet rot-hole material on an old tree of *Fagus sylvatica*, 19.v.

CHANDLER, P.J. – Photographs of larvae and adult specimens of the "army worm" *Sciara militaris* Nowicki (Sciaridae), a new record for the British Isles, exhibited on behalf of Clive Craik. The name army worm relates to larval behaviour, involving aggregation into moving columns, which were observed on 30 & 31.vii.2004 by Jane Eaton and Tom Webster in coniferous forest near Oban, Argyllshire. About ten long moving columns of fly larvae up to 3 metres long were found on a footpath; the columns were of very variable width, height and length, in total containing uncountable thousands of constantly writhing, closely adpressed larvae, each a few mm long. Movement of the larvae forced the columns forward at about 1–2 cm per

hour. Larvae found a few days later, just below the litter layer after the columns had dispersed, were reared and adults emerging in mid August were identified by Frank Menzel. The phenomenon is known widely in central and eastern Europe although the purpose is unknown. The absence of previous observations suggests that it is a recent arrival in Scotland; early stages may have been transported from continental Europe in soil, probably around the roots of young conifer saplings. A full account of this discovery is given in *Dipterists Digest* 12: 21–27.

DEWHURST, C., LOVE, M. & LOVE, S. – *Myopites eximius* Ségué (Tephritidae), Ellanore Marshes, West Wittering, West Sussex (SZ7799, VC13), 19.vii, adults swept from saltmarsh vegetation and 10.xi.2004, galls collected from the host plant *Inula crithmoides*.

DICKSON, R. – *Gymnosoma rotundatum* (L.) (Tachinidae), Botley Wood, Hants (SU5309), 27.vii.2004, collected by D.M. Appleton; he and the exhibitor had recorded this species on 35 occasions over the past three seasons.

FRENCH, M.-A. – Adults and puparia of Diptera reared from truffles *Tuber* species collected near Royston, Herts between viii & x.2004: *Cheilosia soror* (Zett.) (Syrphidae); *Suillia affinis* (Meig.) (Heleomyzidae), a new rearing record although several other species of *Suillia* have previously been reared from truffles in Europe. Also exhibited was a live adult of *Suillia variegata* (Loew) (Heleomyzidae), from the same source, also a new rearing record. Observations were reported on the mating of *S. affinis*, which continued for three hours with the female stroking the male many times with her middle legs.

HALSTEAD, A.J. – Some uncommon or local Diptera collected in 2004. *Rhagio notatus* (Meig.) (Rhagionidae), Savernake Forest, Wilts (SU237656), swept 30.v, (Plate 2, Fig. 13); *Rhingia rostrata* (L.) (Syrphidae), Pewley Down, near Guildford, Surrey (TQ009489), 23.v, swept; *Micropeza lateralis* Meig. (Micropezidae), Brooklands, near Byfleet, Surrey (TQ067618), 17.vii, swept from *Cytisus scoparius*; *Noeeta pupillata* (Fall.) (Tephritidae), Brown's Folly, North Somerset (ST794659), 4.vi, swept; *Campiglossa producta* (Loew) (Tephritidae), Box Hill, Surrey (TQ176521), swept from calcareous grassland; *Tephritis ruralis* (Loew) (Tephritidae), London Zoo (canal area), Regent's Park, London (TQ281836), 17.vii, swept; *Cistogaster globosa* (F.) (Tachinidae), Box Hill, Surrey (TQ176521), swept from calcareous grassland.

HAWKINS, R.D. – (1) Some uncommon flies found in Surrey during 2004. *Dilophus bispinosus* Lundström (Bibionidae), Nonsuch Park, Cheam, 1.ix; *Brachypalpus laphriformis* (Fall.) (Syrphidae), Oxted, 31.v, male landed on trunk of dead *Pinus* tree; *Dorycera graminum* (F.) (Ulidiidae), Priory Park, Reigate, 8.vi, male and female swept from foliage of *Tilia* species by a field of coarse grass.

(2) A non-British robberfly (Asilidae) from just across the Channel. *Paritamus geniculatus* (Meig.), Forêt de Crècy, Somme, France, 24.vi; it was flying with *Neoitamus cyanurus* (Loew) and was at first mistaken for *N. cothurnatus* (Meig.), but the facial knob and male genitalia were quite different.

JONES, R.A. – Some Diptera, as part of a larger exhibit of insects found on brownfield sites, mostly derelict bulldozed zones of broken rubble and overgrown abandoned plots in 2004: *Campiglossa plantaginis* (Hal.) (Tephritidae), swept from *Aster* in fragment of saltmarsh on the River Medway, central Rochester, Kent, 9.vi. *Tephritis matricariae* (Loew) (Tephritidae), several swept in former car parks and wharfs, Chelsea Harbour, London, 18.vi and several swept in overgrown derelict car parks and railway sidings, 26.iv, 15.vi and 1.ix. This fly which develops in flower heads of *Crepis* species is probably a recent arrival in Britain, having first been found at Sandwich, Kent in April 2000. *Tephritis ruralis* (Loew) (Tephritidae), one swept at the edge of polluted pond in a derelict wharf area, Rochester, Kent, 26.iv. *Camarota*

curvipennis Lat. (Chloropidae), many swept from flowery site beside the River Medway, central Rochester, Kent, 26.iv and 1.ix.2004. *Gymnosoma nitens* Meig. (Tachinidae), several visiting flowers of *Daucus carota* in overgrown and derelict car park, central Rochester, Kent, 9 and 15.vi. This parasitoid of the ground-dwelling shield bug *Sciocoris cursitans* F. has recently been found in a number of typical brownfield sites in the East London Corridor of the Thames Estuary.

JONES, A.W. & JONES, R.A.—Several specimens of *Tephritis praecox* (Loew) (Tephritidae). Since first found in 2002 and 2003, this species has continued to appear regularly in a Malaise trap in a garden at Newhaven, East Sussex (TQ455021); in 2004, 29 were recorded including several found sitting on the leaves of the likely food plant, *Calendula officinalis*; most have occurred from July to September, with a single example in April.

PARKER, M.—Some rare or unusual Diptera from Dorset, Wiltshire, Easternness and the Western Isles of Scotland in 2004. *Rhagio annulatus* (De Geer) (Rhagionidae), Savernake Forest, Wilts (SU237656, VC 7), 30.v, female swept from a woodland ride, a new county record. *Chrysops sepulcralis* (F.) (Tabanidae), Stoborough Heath, Dorset (SY9284, VC9), 1.vii, female swept from a bog pool. *Bombylius canescens* Mikan (Bombyliidae), Pewsey Down NNR, Wilts (SU1163, VC8), 4.vi, male swept from calcareous grassland. *Thereva plebeja* (L.) (Therevidae), Colerne Park, Wilts (ST8372, VC 7), 2.vi, female swept from a woodland clearing. *Brachyopa insensilis* Collin (Syrphidae), grounds of The Wiltshire College, Lackham (ST936701), Wilts (VC7), 2.vi, male hovering adjacent to sap run on *Aesculus hippocastanum*. *Epistrophe diaphana* (Zett.) (Syrphidae), Martin Down NNR (SU035198), Wilts (VC8), 5.vi, male at umbel flowers. *Eupeodes lundbecki* (Soot-Ryen) (Syrphidae), female swept from *Senecio jacobaea* adjacent to a dune system at Tangasdal (NF6400), Isle of Barra (VC110), 25.viii. *Pipiza luteitarsis* Zett. (Syrphidae), Cranbourne Chase, Dorset (ST9718, VC9), 18.vi, male hovering in semi-shade in a woodland clearing. *Platycheirus melanopsis* Loew (Syrphidae) female, Cairngorm Mountain Car Park, Easternness (NH988059, VC96), 21.viii. *Platycheirus splendidus* Rotheray (Syrphidae), Yellowham Hill, Dorset (SY731933, VC9), 13.v, male at *Euphorbia amygdaloides* flowers. *Myopites inulaedysentericae* Blot (Tephritidae), Drakenorth, near South Poorton, Dorset (SY525978, VC9), 25.vii, large numbers swept from *Pulicaria dysenterica*. *Campiglossa misella* (Loew) (Tephritidae), West Cliff, Portland, Dorset (SY6872, VC9), 18.vii, female swept from *Artemisia absinthium*. *Merzomyia westermanni* (Meig.) (Tephritidae), Drakenorth, near South Poorton, Dorset (SY525978, VC9), 25.vii, a few swept from herb-rich neutral grassland. *Oxyna nebulosa* (Wied.) (Tephritidae), locality and date as previous species, several swept from herb-rich neutral grassland, the only known Dorset site for the species. *Terellia vectensis* Collin (Tephritidae), data as previous species, known from two other sites in Dorset, an old record from Hod Hill and a recent one for Lulworth.

PERRY, I.—A selection of uncommon Diptera found during 2004. *Ctenophora flavelata* (F.) (Tipulidae), Pondhead Inclosure, New Forest, Hants, 25.v, a male resting on vegetation at the edge of a ride. *Agathomyia falleni* (Zett.) (Platypzeidae), at Ickworth, Suffolk, 1.x, running around on leaves of *Acer pseudoplatanus* near ancient *Fagus sylvatica*, at Wayland Wood, Norfolk, 7.x. on leaves of *Corylus avellana* and at Wandlebury, Cambs, 16.x, all new county records and a considerable northern extension to its range. *Doros profuges* (Harris) (Syrphidae), Devenish Reserve, Wilts, 2.vi, swept from calcareous grassland at edge of *Fagus sylvatica* woodland. *Pocota personata* Harris (Syrphidae), Denny Wood, New Forest, Hants, 26.v, a female flying around rot holes in a small tree of *Fagus sylvatica*. *Odinia*

maculata (Meig.) (Odiniidae), Churchplace Inclosure, New Forest, Hants, 28.v on *Quercus* attacked by *Cossus*. *Periscelis winnertzi* Egger (Periscelididae), Ickworth, Suffolk, 1.ix on mature *Quercus robur* bearing numerous small sap runs. *Sarcophaga argyrostoma* (R.-D.) (Sarcophagidae), Lode, Cambs, 17.vii, on aphid infested *Vicia faba* in garden; *Sarcophaga jacobsoni* Rohdendorf (Sarcophagidae), Gun Hill, Holkham, Norfolk, 27.vii, males resting on path through edge of saltmarsh, first British record since 1954. *Freraea gagatea* R.-D. (Tachinidae), King's Forest, Suffolk, 15.v, a male swept from calcareous heathland. *Cistogaster globosa* (F.) (Tachinidae), D'Engaynes Meadow, Stow-cum-Quy, Cambs, 24.vii, at *Daucus carota* flowers in a recently created meadow, first county record of a species that has extended its range in recent years. *Phasia barbifrons* Girschner (Tachinidae), King's Forest, Suffolk, 17.viii, swept from calcareous heathland, first found at the site in 1994 but not recognised as such at the time. *Bithia modesta* (Meig.) (Tachinidae), Church Ope Cove and Broadcroft Quarry, Isle of Portland, Dorset, 5.vii, at *Daucus carota* flowers.

SCHULTEN, B., ISMAY, J.W. & MANN, D.J. – A new design of flight interception trap (Fig. 1) intended to collect Coleoptera and Diptera was exhibited, designed by Darren Mann and constructed by Dr Curt Lamberth (to whom enquiries concerning the construction or purchase of these traps should be directed at curt@oxfordenvironment.co.uk). This trap consists of a plastic washing-up bowl, into which are set four Perspex vanes at right angles. The trap is protected by a piece of wood above the vanes. It is suspended by a circa 16 m long rope, which is attached to the trap by four cords tied to a knot above. Additional ropes attached to the bowl can be used to steady the trap in windy conditions. In use the rope is thrown over a branch, the washing-up bowl at the bottom is filled with up to one litre of 50–100% car antifreeze (which contains ethylene glycol) and then raised into a tree. The trap is simple and sturdy in construction. It has proven to be extremely useful in dead wood habitats. It can be used high up trees and is unlikely to be noticed, thus reducing the chances of vandalism. The trap catches a small number of specimens, but if placed close to a rot hole or dead wood, it especially targets saproxylic species.



Fig. 1. Vane interception trap for sampling aerial insect fauna. *Ctenophora pectinicornis* (L.) (Tipulidae), *Odinia*

maculata (Meig.) (Odiniidae), *Exechia dizona* Edwards (Mycetophilidae), *Notolaemus unifasciatus* (Lat.) (Cucujidae, Coleoptera) and *Mycetochara humeralis* (F.) (Tenebrionidae, Coleoptera).

The second trap placed at the edge of the ancient woodland bordering a small patch of heathland was also very successful, catching 39 species of Coleoptera and 58 species of Diptera. Some significant species recorded by this trap include *Phaonia cincta* (Zett.) (Muscidae), *Systemus scholtzii* (Loew) (Dolichopodidae), *Conopalpus testaceus* (Olivier) (Melandryidae, Coleoptera) and *Mordellistena humeralis* (L.) (Mordellidae, Coleoptera).

The third trap was placed in secondary woodland within Chigwell Row Wood, in another veteran *Quercus robur* and caught 27 species of Coleoptera and 55 species of Diptera. The findings from this trap include *Lasiambia brevibucca* Duda (Chloropidae), *Oedalea tibialis* Macq. (Hybotidae), *Melasis buprestoides* (L.) (Eucnemidae, Coleoptera) and *Tetratoma desmaresti* Lat. (Tetratomidae, Coleoptera).

WINOKUR, L. & SMITH, C.J. – *Phasia hemiptera* (F.) (Tachinidae), Dodsley Wood (SU539385), near East Stratton, Hants (VC12), 30.vii.2004, first noticed feeding from *Senecio jacobaea* flowers (its resemblance to an *Ectophasia* species depicted on the cover of volume 14(1) of this journal led to its identification from a website).

COLEOPTERA

ALEXANDER, K.N.A. – A selection of rare wood decay beetles from historic parkland sites in northern England including many close here to their northern limits in Britain: *Batrissodes venustus* (Reichenbach) (Pselaphinae), Windypits, Duncombe Park Estate, North-East Yorkshire (VC62), SE58, one from red-rotten oak, 3.vi.2003. *Agilus biguttatus* (F.) (Buprestidae), Calke Park, Derbyshire (VC57), SK32, adults and galleries in collapsed oak bough, 29.vi.2004; also in Kedleston Park, Derbyshire, SK34. *Melasis buprestoides* (L.) (Eucnemidae), Hardwick Park, Derbyshire, SK46, one tapped from lower dead branch on mature open-grown Turkey oak, 18.v.2004. *Procræus tibialis* (Boisduval & Lacordaire) (Elateridae), Calke Park, adults in wood mould in hollow beech tree, 19.v.2004; also in wood-mould in hollow ashes in Kedleston Park. *Malthodes crassicornis* (Mäklin) (Cantharidae), Windypits, Duncombe Park Estate, one from lime foliage, 3.vi.2003. *Lymexylon navale* (L.) (Lymexylidae), Calke Park, one swept beneath ancient oak pollard, 29.vi.2004. *Phloiophilus edwardsii* Stephens (Phloiophilidae), Calke Park, small numbers tapped from lower dead branches on mature open-grown oak trees, 16.ix.2004; more plentiful in Kedleston Park. *Aplocnemus nigricornis* (F.) (Melyridae), Calke Park, Derbyshire, one swept beneath ancient oak pollard, 29.vi.2004. *Notolaemus unifasciatus* (Latreille) (Laemophloeidae), Kedleston Park, one tapped from dead twigs of fallen oak branch in open parkland, 1.vii.2004. *Tetratoma desmaresti* Latreille (Tetratomidae), Hardwick Park, one tapped from dead lower branch on mature open-grown Turkey oak, 13.x.2004. *Anisoxya fuscata* (Illiger) (Melandryidae), Kedleston Park, beaten from elder beneath ancient open-grown ash tree, 21.vii.2004; also Castle Hill, Duncombe Park Estate, off oak, vi.2003. *Abdera biflexuosa* (Curtis), Kedleston Park, tapped from lower dead branches on mature open-grown oaks, 30.vi.2004. *Hypulus quercinus* (Quensel), Beech Wood & Castle Hill, Duncombe Park Estate, north-east Yorkshire, four on ancient oak pollards, 2.vi.2003; Castle Gill, Duncombe, one swept beneath ancient lime tree, 10.vi.2004. *Corticæus unicolor* Piller & Mitterpacher (Tenebrionidae), Calke Park, frequent beneath moist bark on ash stump, 28.vi.2004. *Anoplodera sexguttata* F.

(Cerambycidae), Castle Gill, Duncombe Park Estate, North-East Yorkshire, frequent at hogweed blossom, 7.vi.2003.

ALLEN, A. J. – (1) Some beetles collected by A.J. Allen. *Meloe violaceus* Marsham Kingston Dorset SY9479 13.iii.2004, although *M. proscarabaeus* L. is not uncommon near the Dorset coast this is the first example of *M. violaceus* that the exhibitor had seen. It was crossing a minor road and immediately caught the exhibitor's attention by the bright blue green head and pronotum. Alex Ramsay (*British Wildlife*, October 2002: 27–30) says that adults are commonly encountered walking along paths, but this is not the exhibitor's experience in Dorset or elsewhere.

(2) The following species were found on a BENHS field trip to the shore and marshes north of Kingsferry Bridge, Kent (TQ9169) on 13 June 2004. None of the species is new to the area but all have a localised distribution and a Nationally Scarce or Red Data Book national status. Another visit was made on 14.viii.2004 when the only one of these species found was *Pseudaplemonus limonii*. *Polystichus connexus* (Fourcroy), one by sieving tidal refuse; *Dolichosoma lineare* (Rossi), one by sweeping; *Malchius vulneratus* Abeille, several in one small area of saltmarsh; *Pseudaplemonus limonii* (Kirby), on sea-lavender; *Bagous subcarinatus* Gyllenhal, in vegetation at the edge of a small pool; *Baris scolopacea* Germar, on sea-purslane; *Mecinus janthinus* Germar, on common toadflax beside the road close to the bridge.

APPLETON, D. – Some uncommon beetles from South Hampshire (VC11) in 2004. *Platydracus fulvipes* (Scopoli) (Staphylinidae), Botley Wood, SU5310, on gravel path, 26.v.2004; *Epiphanis cornutus* Escholtz (Eucnemidae), Botley Wood, SU5309, beaten off maple at dusk, 19.iv.2002 and swept, 28.vi.2004; *Cerapheles terminatus* (Metetries) (Melyridae), Hook Park, SU4904, swept on the coast, 19.v.2004; *Uleiota planata* (L.) (Cucujidae), Botley Wood, SU5310, under loose bark of fallen bough, 9.x.2004; *Molorchus umbellatarum* (von Schreiber) (Cerambycidae), Botley Wood, SU5309, on hogweed umbel, 5.vii.2004.

BOOTH, R. G. – Locally interesting or notable species collected mainly during 2004. *Agonum nigrum* Dejean (Carabidae), Syon Park, Middlesex, TQ1776, at edge of ditch joining River Thames, 16.ix.2004, there are very few Thames Estuary records for this predominantly coastal species. *Hister quadrimaculatus* L. (Histeridae), Graveney Marshes, East Kent, TR06, under strandline debris, 20.iv.2004. *Acrotichis sanctaehelenae* Johnson (Ptiliidae), Aldreth, Cambridgeshire, TL438735, sieved from grass cuttings on a large pile of straw and manure etc., 6.vii.2003 and Brockington Down, Dorset, SU0111, sieving silage, 15.x.2003, further records for this relatively recent arrival. *Proteinus crenulatus* Pandellé (Staphylinidae), Rockford, North Devon, SS755478, sieving wet moss and debris on rocks at side of East Lynn River, 4.vi.2004, apparently new to Devon. *Carpelimus obesus* (Kiesenwetter) (Staphylinidae), Chetney Marshes, East Kent, TQ896701, on wet mud, 13.vi.2004 and Bewl Water, West Kent, TQ697317, on wet mud at edge of reservoir, 29.vii.2004, this species continues to spread in south-east England. *Anotylus hamatus* (Fairmaire & Laboulbène) (Staphylinidae), Sevenoaks Wildfowl Reserve, West Kent, TQ5256, from wet hollow alongside track, 20.v.2004. *Stenus canescens* Rosenhauer (Staphylinidae), Morden Hall Park, Surrey, TQ2668, on wet mud and swept vegetation, 8.vii.2004. *Paederus fuscipes* Curtis (Staphylinidae), Sand Gate Marsh, Westmorland, SD3575, grubbing under stones etc. at edge of saltmarsh, 12.viii.2004, this is more or less at the species' northernmost limit of its range in Great Britain. *Lathrobium pallidum* von Nordmann (Staphylinidae), Bookham Common, Surrey, TQ1256, one female from underground pitfall trap at base of old dead oak, 10.vii.–1.viii.2004, apparently new to Surrey. *Medon piceus* (Kraatz) (Staphylinidae), Bookham Common, Surrey, TQ1256, singletons from underground pitfall traps at

base of old dead oak, 10.i.–21.ii.2004 and 13.iii.–10.iv.2004, also recently recorded from the Common by Professor J.A. Owen. *Quedius aetolicus* Kraatz (Staphylinidae), Bookham Common, Surrey, TQ1256, two females sieved from squirrel's drey, 13.xii.2003, previously recorded from the Common by Dr A.M. Easton during the 1940s. *Quedius riparius* Kellner (Staphylinidae), Rockford, North Devon, SS755478, sieving wet moss and debris on rocks at side of East Lynn River, 4.vi.2004, apparently new to North Devon. *Gyrophaena lucidula* Erichson (Staphylinidae), Sevenoaks Wildfowl Reserve, West Kent, TQ5256, from wet hollow alongside track, 20.v.2004. *Actocharis readingii* Sharp (Staphylinidae), Woody Bay, North Devon, SS678489, under stones near upper tide line on beach, 3.vi.2004, a post-1970 record for the North Devon coast. *Adota immigrans* (Easton) (Staphylinidae), Studland Heath, Dorset, SZ032860, under strandline debris at edge of Poole Harbour, 12.v.2004. *Philhygra parca* (Mulsant & Rey) (Staphylinidae), Bookham Common, Surrey, TQ1256, sieved from leaf litter at base of old oak tree, 21.ii.2004 and subsequent dates, possibly new to Surrey. *Atheta aquatilis* (Thomson) (Staphylinidae), Martinhoe, North Devon, SS666493, sieving wet moss from Hollow Brook waterfall, 3.vi.2004. *Atheta fussi* Bernhauer (Staphylinidae), Bookham Common, Surrey, TQ1256, under burnt wood at fresh bonfire site, 11.ix.2004, although recorded before from Surrey there are very few UK records of this species. *Atheta zosteræ* (Thomson) (Staphylinidae), Bewl Water, West Kent, TQ697317, on wet mud at edge of reservoir, 29.vii.2004. *Lomechusa emarginata* (Paykull) (Staphylinidae), Detling, East Kent, TQ789588, in suction sample from short chalk-downland turf, 20.iv.2004. *Amarochara forticornis* (Lacordaire in Boisdual & Lacordaire) (Staphylinidae), Sevenoaks Wildfowl Reserve, West Kent, TQ5256, from sandy bank alongside track, 20.v.2004, a post-1970 record for Kent. *Meligethes rotundicollis* Brisout, Beddington Sewage Farm, Surrey, TQ2866, several on various yellow-flowered crucifers, 2.v.2004 and subsequent dates. *Paramecosoma melanocephalum* (Herbst) (Cryptophagidae), Rockford, North Devon, SS755478, sieving wet moss and debris on rocks at side of East Lynn River, 4.vi.2004, there appear to be very few records of this species from south-west England. *Corticaria fagi* Wollaston (Latridiidae), Bookham Common, Surrey, TQ1256, on burnt wood at fresh bonfire site, 11.ix.2004, apparently new to Surrey there are very few UK records of this species. *Orchesia micans* (Panzer) (Melandryidae), Heddon's Mouth Cleave, North Devon, SS654489, larvae from fallen *Inonotus hispidus* sporophore, 3.vi.2004 and adults later emerging up to end of June, apparently new for North Devon. *Mordellistena pseudoparvula* Ermisch (Mordellidae), Canvey Island, South Essex, TQ7683, sweeping track-side vegetation, 19.vi.2004. *Agapanthia villosoviridescens* (De Geer), (Cerambycidae), Ferry Marshes, Iwade, East Kent, TQ9069, sweeping along sea wall, 13.vi.2004. *Nanophyes gracilis* Redtenbacher (Apionidae), Sevenoaks Wildfowl Reserve, West Kent, TQ5256, from wet hollow alongside track, 20.v.2004, possibly new for Kent. *Smicronyx reichi* (Gyllenhal) (Curculionidae), Sevenoaks Wildfowl Reserve, West Kent, TQ5256, grubbing and sieving moss at base of *Centaureum* plants where lower leaves were shot-holed, 20.v.2004, a post-1970 record for Kent. *Bagous collignensis* (Herbst) (Curculionidae), Ferry Marshes, Iwade, East Kent, TQ9069, water netting in ditch adjacent to sea embankment, 13.vi.2004, a post-1970 record for Kent. *Tychius brevisculus* Desbrochers (Curculionidae), Canvey Island, South Essex, TQ7783, sweeping melilot on sandy bank, 19.vi.2004, apparently the second British record although also collected here and elsewhere in Essex by others in 2004.

BOWDREY, J.P.-(1) Some Coleoptera found in North Essex (VC19) in 2004. *Bembidion* (*Notaphemphanes*) *ephippium* (Marsham) (Carabidae), Stone Point,

Walton-on-the-Naze, TM2525, under stones on sandy spit, 17.iv.2004. *Harpalus (Ophonus) ardosiacus* Lutschnik (Carabidae), Walton-on-the-Naze, TM2623, under stone on stabilised cliff, 20.iii.2004. *Lebia chlorocephala* (Hoffmannsegg) (Carabidae), Hatfield Forest, TL5419, running on the ground, 15.v.2004. *Harmonia axyridis* Pallas (Coccinellidae), The Moors, Colchester, TM0124, 22.x.2004. *Ischnomera cyanea* (F.) (Oedemeridae), Hatfield Forest, TL5320, on the ground near rotten horse chestnut, 15.v.2004. *Sibinia primitus* (Herbst) (Curculionidae), Thorpe-le-Soken, TM1821, in vacuum sample in disused gravel pit, 11.ix.2004.

(2) Live examples of *Harmonia axyridis* Pallas (Coccinellidae) from Colchester, North Essex.

BOYD, G. – (1) A selection of ground beetles (Carabidae) collected during 2003 and 2004. *Pterostichus (Platysma) macer* (Marsham), Titchmarsh Reserve, Northants (VC32), TL0080, 17.iv.2003. *Pterostichus (Bothriopterus) oblongopunctatus* (F.), Harlestone Heath Reserve, Northants (VC32), SP7264, 12.iv.2003. *Pterostichus (Bothriopterus) quadrifoveolatus* Letzner (= *P. angustatus* Duftschmid), Rothwell Gullet Reserve, Northants (VC32), SP8081, 7.iv.2003. *Pterostichus (Pseudomaseus) gracilis* (Dejean), Holcot, Northants (VC32), SP7970, bank of Pitford Reservoir, 16.v.2004 and Dinton Pastures Country Park, Winnersh, Berkshire, SU7872, 22.v.2004. *Anthraxus consputus* (Duftschmid), Holcot, Northants (VC32), SP7970, bank of Pitford Reservoir, 16.v.2004. *Demetrias (Aetophorus) imperialis* (Germar), Summer Leys Reserve, Wollaston, Northants (VC32), SP8863, 25.iv.2004. *Syntomus truncatellus* (L.), Sewell Cutting Reserve, Houghton Regis, Bedfordshire, SP9922, 24.iv.2004.

(2) A photograph of the Bombardier Beetle *Brachinus crepitans* (L.) taken by Henry Stannier, Sammock Hill, Ring Haw Reserve, Yarwell, Northants (VC32), TL0597, one of a pair found by the exhibitor under an ancient prostrate wooden gatepost, 4.viii.2004.

GALSWORTHY, A.C. & BOOTH, R.G. – A rove beetle new to Britain. *Acrotoma pseudotenera* (Cameron) (Staphylinidae), Merton Park, Surrey, TQ26, sieving grass cuttings from garden compost heap, 13.viii.2004 and subsequently. An adventive oriental species collected by A.C. Galsworthy and identified by R.G. Booth.

GIBBS, D.J. – Coleoptera collected in 2004. *Tachys scutellaris* Stephens (Carabidae), Minsmere RSPB Reserve, East Suffolk, TM4766, in pitfall trap on brackish lagoon margin, 18.v.–1.vi.2004. *Bembidion (Notaphemphanes) ephippium* (Marsham) (Carabidae), Havergate Island RSPB Reserve (North Lagoon), East Suffolk, TM4148, in brackish lagoon, 17.v.2004. *Bledius bicornis* (Germar) (Staphylinidae), Minsmere RSPB Reserve, East Suffolk, TM4766, in pitfall trap on brackish lagoon margin, 18.v.–1.vi.2004. *Oulema erichsoni* (Suffrian) (Chrysomelidae), Blagdon Lake, North Somerset, ST5258, on lake margin, 26.iv.2004 and 6.vii.2004, first record north of the Mendip Hills. *Mantura obtusata* (Gyllenhal), (Chrysomelidae), Havergate Island RSPB Reserve, East Suffolk, TM4046, reared from mines in *Rumex acetosella* growing on shingle, 17.v.2004. *Aspidapion sorror* (Rey) (Apionidae), Minsmere RSPB Reserve, East Suffolk, TM4766, on *Althaea officinalis*, 10.viii.2004. *Pelenomus canaliculatus* (Fahraeus) (Curculionidae), Blagdon Lake, North Somerset, ST5160, 6.vii.2004, second Somerset record. *Dorytomus filirostris* (Gyllenhal) (Curculionidae), Keynsham Environmental Park, North Somerset, ST6668, swept off lombardy poplar, 13.v.2004.

HALSTEAD, A. – *Uleiota planata* (L.) (Cucujidae), Mimbridge Meadow, south-west of Chobham, Surrey, SU993607, on oak log, 15.xi.2003. *Coccinella magnifica* Redtenbacher (Coccinellidae), Flatropers Wood, Peasmarsh, East Sussex, TQ865226, swept, 15.x.2004. *Coccinella septempunctata* (L.) (Coccinellidae), Pewley

Down, Guildford, Surrey, TQ009489, melanic form swept, 18.vii.2004. *Harmonia axyridis* (Pallas) (Coccinellidae), Steep near Petersfield, North Hampshire, SU739264, 1.xi.2004. *Cryptocephalus bilineatus* (L.) (Chrysomelidae), Zig-Zag Road, Box Hill, Surrey, TQ176521, swept, 15.viii.2004. *Chrysolina sanguinolenta* (L.) (Chrysomelidae), Two Mile Bottom, Thetford Forest, West Norfolk, TL852880, swept off *Linaria vulgaris*, 22.viii.2004. *Curculio villosus* (F.) (Curculionidae), Brooklands near Byfleet, Surrey, TQ068625, swept, 25.iv.2004.

HAWKINS, R.D.—(1) Observations on some common beetles found in Surrey during 2004. *Chrysolina oricalcia* (Müller) (Chrysomelidae), Nonsuch Park, Cheam, 110 adults on six plants of *Heracleum sphondylium* among long grass, 6.vii; *Phaedon tumidulus* (Germar) (Chrysomelidae), Nonsuch Park, Cheam, 190 adults on the same hogweed plants, 6.vii—the leaves of these plants had been shredded by the beetle larvae. *Galeruca tanacetii* (L.) (Chrysomelidae), South Nutfield, five larvae on or under flower heads of *Chrysanthemum leucanthemum*, 27.v (one adult reared). *Dromius linearis* (Olivier) (Carabidae), Nonsuch Park, Cheam, fully-winged male, 6.viii (stated in Lindroth's RES handbook to be probably always short-winged in Britain). *Anaglyptus mysticus* (L.) (Cerambycidae), South Godstone, 25.v; *Phymatodes alni* (L.) (Cerambycidae), Park Downs, Banstead, 23.v. The elytra of these two longhorn beetles have a similar pattern which can confuse the unwary.

(2) A selection of *Harmonia axyridis* (Pallas) (Coccinellidae) from the USA (previously shown at an indoor meeting). This species has now arrived in Britain.

JONES, R.A.—Some Coleoptera, as part of a larger exhibit, found on brownfield sites, mostly derelict bulldozed zones of broken rubble and overgrown abandoned plots. *Dicheirotichus obsoletus* (Dejean) (Carabidae), several found under herbage on derelict concrete wharf, Rochester, 1.ix.2004. This is a salt-marsh species, most often found in the Thames Estuary, but found in other small pockets from Penzance to Hull—Nationally scarce (notable B). *Stenolophus teutonius* (Schränk) (Carabidae), one found under a piece of broken concrete at the muddy edge of a polluted pond, Rochester, 15.vi.2004. This scarce beetle occurs only in southern England, mainly Hampshire, Surrey and Sussex. It is a species of damp open ground such as gravel pits and pond margins. Although it is recorded from the Estuary coast of South Essex, on the north of the river Thames, this appears to be the first time it has been found in Kent. Nationally scarce (notable B). *Amara curta* (Dejean) (Carabidae), one collected by suction sampler on 'ecoroof' on the Horniman Museum, 16.vi.2004. This is a very local species usually associated with dry localities such as gravel pits, limestone grassland, dunes and heathland. It is coastal in distribution but has been recorded on several brownfield sites in the London area. Nationally scarce (notable B). *Amara eurynota* (Panzer) (Carabidae), one in a pitfall trap on an 'ecoroof' Canary Wharf, 25.vi.2003; also several found under broken bricks and concrete in derelict ground, Beckton, 1 & 3.xi.2004. Although widespread through most of England and Wales, this beetle is not common and usually occurs in open ground with sparse vegetation and areas of bare soil. *Harpalus ardosiacus* Lutschik (Carabidae), one found under brick in bulldozed pile of rubble, Beckton, 3.xi.2004. This is mainly a species of southern England, and most localities are coastal or estuarine. Nationally scarce (notable B). *Platyderus ruficollis* (Marsham) (Carabidae), one under brick in bulldozed pile of rubble, Beckton, 3.xi.2004. This southern and eastern species occurs in dry sandy or chalky places in open situations. Nationally scarce (notable B). *Bruchella rufipes* (Olivier) (Urodontidae), several found on *Reseda lutea* on former railway sidings, Rochester, 9.vi.2004 and flowery brownfield site next to the river Medway, central Rochester, 1.xi.2004. It is more or less confined to Essex, Kent and the London area, where it was discovered new to

Britain in the late 1980s. *Cytillus sericeus* (Forster) (Byrrhidae), several in pitfall traps on 'ecoroofs', Canary Wharf, 6.v.2003, 6.viii.2003; one collected dead by suction sampler on 'ecoroof' on the Horniman Museum, 24.ix.2004. Although not considered a very scarce species, the exhibitor had never found it in London until it appeared on these roofs. *Rhyzobius chrysomeloides* (Herbst) (Coccinellidae), one beaten from sallow tree in rough ground near the Grand Union Canal, Southall, 27.x.2004. This beetle was only recognised as British in 2000 when it was found in several Surrey localities (the first being a roadside verge). It is probable that this is a recent arrival in Britain and its spread has so far been monitored in Surrey, Kent, Middlesex and Berkshire. *Olibrus flavicornis* (Sturm) (Phalacridae), many swept in overgrown former car park and derelict former wharfs, Chelsea Harbour, 18 & 24.vi.2004; very many specimens swept in flowery overgrown derelict carparks, railway sidings and wharfs, Rochester, 26.iv, 19.vi and 1.ix.2004; many swept in flowery derelict land, Beckton, 1 & 3.xi.2004. This beetle is associated with autumn hawkbit *Leontodon autumnalis*, and possibly with other species in that and related genera. The larvae are thought to develop in the flower heads, while the adults feed on pollen. At the time of the national review of beetles, this species had not been seen since it was recorded in 1950 from Camber on the East Sussex coast. However, it has recently been recorded very frequently in the London and Thames Valley region, particularly on the flowery brownfield post-industrial sites that now characterise the area. Nationally rare but insufficiently known (Red Data Book category K), but status needs revision. *Cryptocephalus hypochaeridis* (L.) (Chrysomelidae), several specimens swept in flowery derelict wharfs next to the River Medway, central Rochester, 15.vi.2004. A rather local, but quite widespread beetle associated with chalk downland and other dry places where it feeds on hawkbits. *Longitarsus dorsalis* (F.) (Chrysomelidae), two swept in overgrown railway sidings and wharfs, Rochester, 26.iv.2004; two swept in flowery derelict land, Gallions Reach, Beckton, 1 & 3.xi.2004. Although widespread across much of England, this is mainly a southern species. It occurs on ragworts, usually on dry sandy or chalky soils or on coastal cliffs and landslips. Nationally scarce (notable B). *Kalcopion semivittatum* Gyllenhal (Apionidae), several swept from the foodplant *Mercurialis annua* on disturbed ground, Rochester, 1.ix.2004. This species is more or less confined to south-east England, the Thames Estuary and the Thames Valley, where the plant grows in disturbed places. Nationally scarce (notable A). *Mecinus janthinus* Germar (Curculionidae), several swept on flowery derelict wharf near saltmarsh fragments on the River Medway, central Rochester, 26.iv and 15.vi.2004. First discovered in Britain in 1948, it is recorded only from Kent, Surrey, Middlesex and Essex where its foodplant is *Linaria vulgaris*, usually in disturbed places. Nationally scarce (notable A). *Phyllobius vespertinus* (F.) (Curculionidae), several swept in saltmarsh fragments next to derelict wharfs on the river Medway, central Rochester, 16.iv and 15.vi.2004. This saltmarsh beetle is associated with *Artemisia maritima*. Nationally scarce (notable B).

LEVEY, B. – (1) Six rare and notable species collected in 2004. *Trachys scrobiculatus* Kiesenwetter (Buprestidae), Perham, South Tidworth, North Hampshire, SU236463, ten specimens were collected by suction sampling chalk grassland on 30.v.2004. *Dorcatoma dresdensis* Herbst (Anobiidae), by the River Monnow, Kentchurch, Monmouthshire, SO4025, three specimens bred from a bracket fungus (*Inonotus* sp.?) collected from a dead aspen, 18.v.2004, the first record for Wales. *Rhizophagus picipes* (Olivier) (Rhizophagidae), by the River Monnow, Kentchurch, Monmouthshire, SO4025, five specimens under bark of cut aspen logs, 18.v.2004. *Cyanostelus aeneus* (Richter) (Rhizophagidae), by the River Monnow, Kentchurch, Monmouth-

shire, SO4025, 16 specimens under bark of cut aspen logs, 18.v.2004. *Anisoxya fuscula* (Illiger) (Melandryidae), Whitchurch, Cardiff, Glamorgan, ST1579, eight specimens bred from dead twigs of a cultivated apple collected in the autumn of 2003 from the exhibitor's garden, adults emerged 12.vi.2004. *Osphya bipunctata* (F.) (Melandryidae), Castle Combe, north Wiltshire, ST8476, a single specimen beaten from flowering shrubs, 3.vi.2004.

(2) A nineteenth or early twentieth century British specimen of *Rhamphus subaeneus* Illiger (Curculionidae). The specimen was collected at Tring, Hertfordshire by E.C. Elliman, who lived in Chesham, and who collected beetles between about 1891 and 1909. The specimen was found in the collection of J.R. Le B. Tomlin, who purchased Elliman's collection in 1929. This species has recently been found in the Epping region of south Essex by Peter Hammond and was thought to be new to Britain.

LOVE, M.R.—A specimen of the Hornet Rove Beetle *Velleius dilatatus* (F.) (Staphylinidae), Bignor, West Sussex, SU9916, found dead (?drowned) in bath inside house, vii.2003, new to Sussex.

MORRIS, M.G.—A selection of continental specimens of species of Ceutorhynchinae (Curculionidae) which are rare or uncommon in Britain. Ceutorhynchini: *Ceutorhynchus alliariae* Brisout, H. Flirey, Meuthe-et-Moselle, France, 29.v.1983; *C. chalybaeus* Germar, near Chia, Sardinia, 3.v.1996; *C. constrictus* (Marsham), Galicica National Park, Macedonia, 15.vi.1990; *C. hepaticus* (Gyllenhal) [possibly extinct in Britain; last recorded in 1909], near Trapzica, Macedonia, 12.vi.1990; *C. pervicax* Weise, Jaszcze, Gorce National Park, Poland, 31.v.1992; *C. picitarsis* Gyllenhal, near Tallard, Hautes-Alpes, France, 20.v.2001; *C. pulvinatus* (Gyllenhal), Danube delta, Roumania, 4/5.v.1995; *C. sulcicollis* (Paykull), near Lacourt, Ariège, France, 16.vii.2003 and Gerardmer, Vosges, France, 30.v.1983; *C. syrtes* [probably extinct in Britain], Causse Mejean, Lozere, France, 18.v.2001; *C. thomsoni* Kolbe, near Montecote, Cadiz province, Spain, 4.iv.1992 and near Tallard, Hautes-Alpes, France, 20.v.2001, and *C. unguicularis* Thomson, Causse Mejean, Lozere, France, 18.v.2001; *Coeliodus ruber* (Marsham), Domfront, Orne, France, 24.v.1983; *C. transversealbofasciatus* (Goeze) [= *erythroleucus* (Gmelin)], near Essay, Orne, France, 24.v.1983; *Coeliodinus nigritarsis* (Hartmann), near Gerardmer, Vosges, France, 30.v.1983; *Datonychus angulosus* (Boheman), St Junien-la-Bergere, Creuse, France; 16.vii.1998 and Koswzynska, Pieniny National Park, Poland, 6.vi.1992; *D. arquata* (Herbst), Notre-Dame-des-Landes, Loire-Atlantique, France, 14.viii.2003; *D. urticae* (Boheman), near Les Gras, Doubs, France, 19.v.1992; *Drupenatus nasturtii* (Germar), near Barao de São João, Algarve, Portugal, 5.v.2003; *Glocianus moelleri* (Thomson), Triglav National Park, Slovenia, 21.vi.1990; *G. punctiger* (Gyllenhal), near Les Allies, Doubs, France, 19.v.1992 and Silves, Algarve, Portugal, 26.v.2004; *Mogulones geographicus* (Goeze), Ria Formosa National Park, Algarve, Portugal, 7.iv.2000 and near Zahora, Cadiz province, Spain, 6.iv.1992; *Oprohinus suturalis* (F.), [very dubiously recorded from Britain], near Orchid, Macedonia, 13.vi.1990; *Stenocarus ruficornis* (Stephens), Causse Mejean, Lozere, France, 10.vii.2003; *Tapeinotus sellatus* (F.), near Coloz, Ain, France, 2.vi.1983; *Thamiocolus viduatus* (Gyllenhal), Senheim, Mosel, Germany, 29.viii.1978; *Trichosirocalus barnevillei* (Grenier), near Mont-Louis, Pyrénées-Orientales, France, 20/21.vii.2002; *T. dawsoni* (Brisout, Ch.), Pointe du Raz, Finistere, France, 21.iv.1994; *T. horridus* (Panzer), Causse Majean, Lozere, France, 17.vi.1999; *T. rufulus* (Dufour), near Fontaine-les-Grès, Aube, France, 3.vi.1997; *T. thalhammeri* (Schultze), Agon-Coutainville, Manche, France, 4.ix.1996; *Zacladus exiguus* (Olivier), Barragues, Isere, France, 4.vi.1983; *Z. geranii* (Paykull),

Sunnaldalen, More og Romsdal, Norway, 22.vi.1991; Mononychini: *Mononychus punctumalbum* (Herbst), near Aljezur, Algarve, Portugal, 2.v.2003; Phytobiini: *Pelenomus comari* (Herbst), near Villiersexel, Haute-Saone, France, 15.ix.1985; *P. waltoni* (Boheman), Notre-Dame-des-Landes, Loire-Atlantique, France, 13.viii.2003; Scleropterini: *Rutidosoma globulus* (Herbst), Genissiat, Haute-Savoie, France, 2.vi.1983.

WHITTON, P. – A male *Trichius zonatus* Germar (Scarabaeidae), Beckley, Oxfordshire, SP557110, on a peony flower in a south-facing garden, 5.vii.2004.

HEMIPTERA

BADMIN, J.S. – *Cercopis intermedia* Kirschbaum (Cercopidae), Castro Verde, Alentejo, southern Portugal, 19.iv.2004. Compared to specimens of *Cercopis vulnerata* Rossi (Cercopidae).

BROOKE, S. & NAU, B.S. – *Eysarcoris aeneus* (Scopoli) (Pentatomidae), 20 plus adults and one fifth instar nymph, New Forest, September 2003, swept from mature heather (*Calluna vulgaris*) in sunny sheltered places amongst open scrub. Host plant assumed to be *C. vulgaris*, and possibly the *Erica* spp. growing with it; no sign of Slender St John's-Wort which is claimed as the host plant in Southwood & Leston's (1959) *The Land and Water Bugs of the British Isles*.

Exhibit of some bugs on the Bedfordshire Greensand, associated with sandy, south-facing, sparsely vegetated areas with mosses and plants such as *Erodium*, *Myosotis* and *Cerastium*, possibly disturbed by rabbits and/or trampling: *Megalonotus dilatatus* (H.-S.) (Lygaeidae), *M. praetextatus* (H.-S.) (Lygaeidae), *M. sabulicola* (Thomson) (Lygaeidae), *Graptopeltus lynceus* (F.) (Lygaeidae), *Peritechus hundi* (Gmelin) (Lygaeidae), *Spathocera dahlmanni* (Schilling) (Coreidae), *Syromastes rhombeus* (L.) (Coreidae), *Arenocoris falleni* (Schilling) (Coreidae), *Bathysolen nubilus* (Fallén) (Coreidae), *Alydus calcaratus* (L.) (Alydidae), *Sehirus luctuosus* (Mulsant & Rey) (Cydnidae), *Odontoscelis lineola* (Rambur) (Scutelleridae).

DICKSON, R. – *Hypseloecus visci* (Puton) (Miridae), 1♂, 2♀♀, Fareham, SU579069, MV, 2004; *Eurydema oleracea* (L.) (Pentatomidae), Wickham Common, SU5810, swept from annual crucifer, 7.vi.2004 (red form); Whiteley, SU5309, nymphs on yellow crucifer, 19.vii.2004 bred D.M. Appleton (typical form). *Nysius graminicola* (Kolenati) (Lygaeidae), Botley Wood, SU5510, swept 1.ix.2004, 21.viii.2004 and 25.viii.2004. *Stictopleurus punctatonervosus* (Goeze) (Rhopalidae), swept various dates and localities in Botley Wood during 2004. Also recorded by D.M. Appleton from Botley Wood, SU5309, on *Oenanthe*, 4.vi.2004, and Whiteley SU5309 on *Matricaria* or similar 2.vi.2004.

GIBBS, D. – *Tuponia mixticolor* (A. Costa) (Miridae), Minsmere RSPB Reserve (TM4766), Suffolk, 13.vii.2004, swept from tamarisk on dunes.

HAWKINS, R.D. – Some Heteroptera found in Surrey during 2004 that appear to be expanding their range: *Aphanus rolandri* (L.) (Lygaeidae), Park Hill, Reigate, 23.vii et seq., many adults and nymphs around upturned root-plate of fallen tree (the site had recently been cleared of trees to create a viewpoint; with *Corydalis claviculata* (L.) prominent among the sparse ground flora). Also three species from Nonsuch Park, Cheam: *Berytinus hirticornis* (Brull) (Berytidae), 6.viii, male and female swept from long grass; *Buchananiella continua* (White) (Anthocoridae), 1.ix, beaten from *Acer pseudoplatanus*, along with many specimens of *Orius vicinus* (Ribaut) which it closely resembles; *Deraeocoris flavilinea* (Costa) (Miridae), 6.vii, beaten from *Acer pseudoplatanus* (the last two species have only recently been discovered in Britain).

JONES, R.A.—Some Hemiptera, as part of a larger exhibit, found on brownfield sites, mostly derelict bulldozed zones of broken rubble and overgrown abandoned plots. *Aphrodes aestuarinus* (Edwards) (Cicadellidae), many specimens were swept from various tiny fragments of saltmarsh that have recolonised against derelict wharfs on the River Medway, central Rochester, 1 & 14.ix.2004. Limited to saltmarshes along southern coasts of Britain, it is thought to be associated with sea-blite, *Suaeda* species. Nationally scarce (notable B). *Asiraca clavicornis* (F.) (Delphacidae), many specimens swept in overgrown and derelict railway sidings and flowery brownfield sites, central Rochester, 9 & 16.vi and 1.ix.2004. Although once more widespread, this insect is now more or less confined to the Thames Estuary and the London area in the UK. It is associated with dry grassy places with areas of bare ground and has been found in several urban brownfield sites in London. Nationally scarce (notable B). *Eurygaster maura* (L.) (Scutelleridae), one swept in overgrown and derelict railway sidings, central Rochester, 9.vi.2004. Known almost entirely from the chalk downs of Hampshire, Surrey and Kent, it has previously been recorded from dune grasslands. It is thought to have been more widespread during the middle of the 20th century but has declined with changing land use on limestone downs. Nationally scarce (notable B). *Stictopleurus punctatonervosus* (Goeze) (Rhopalidae), many specimens swept in overgrown former car park and wharfs, Chelsea Harbour, 18.vi & 19.vii.2004; many specimens in derelict overgrown railway sidings, car parks and wharfs, Rochester, 26.iv, 15.vi and 1.ix.2004; several specimens swept in flowery derelict land, Gallions Reach, Beckton, 1.xi.2004. Since recolonising southern England in the 1990s this species is now widespread on urban brownfield sites. *Stictopleurus abutilon* (Rossi) (Rhopalidae), several specimens swept in flowery derelict land, Gallions Reach, Beckton, 1.xi.2004. This species, too, has spread widely since recolonising southern England in the 1990s. *Sciocoris cursitans* (F.) (Pentatomidae), one swept in derelict overgrown car park, central Rochester, 9.vi.2004. Known only from scattered localities in the south of England, from Essex to Cornwall, it is found in dry sunny locations, usually on chalky or sandy soils. Nationally scarce (notable B). *Neottiglossa pusilla* (Latreille) (Pentatomidae), one swept from grassy brownfield site of derelict wharf next to the River Medway, Rochester, 1.ix.2004. This is typically a bug of acid grassland and heaths; although not given nationally scarce status, this bug appears to be much less common than previously noted. *Syromastus rhombeus* (L.) (Coreidae), one taken in pitfall trap in derelict ground, Deptford Creek, 11.vi.2003. This very local shieldbug of dry sandy heaths appears to have declined seriously in recent years. The only other recent London record is from Southwark Park, also on the River Thames, 1997. *Piesma quadratum* Fieber (Piesmidae), many swept in saltmarsh fragments next to derelict wharfs on the River Medway, central Rochester, 26.iv and 9.vi.2004. This bug is confined to saltmarshes around Britain, and is associated with oraches and goose-foots. *Myrmus miriformis* Fallen (Rhopalidae), one swept from overgrown former wharfs, the River Medway, Rochester, 1.ix.2004. This is mainly a species of coastal downs and cliffs, but has recolonised this urban brownfield site. *Deraeocoris flavilinea* (Costa) (Miridae), one swept in overgrown former car park, Chelsea Harbour, 18.vi.2004. Since it was first discovered in Britain, in the Lea Valley of north-east London, in the 1990s, this bug has continued to spread. Sycamore and maples are its primary food-plant, but it is also often found by general sweeping of the herbage.

NAU, B.S.—*Naucoris maculatus* F. (Naucoridae), breeding in a pond near Dover, September 2004. Exhibited with *Ilyocoris cimicoides* (L.) (Naucoridae), hitherto the only British saucer bug. Obvious differences are size and the patterning on the pronotum.

STEWART, A.J.A. – *Cicada orni* L. (Cicadidae), single female found dead by non-entomologist lady in a garden in Tunbridge Wells in late August or early September 2004, no further details available. This species (Plate 2, Fig. 11) is one of the common cicadas in the Mediterranean region; southern England is considerably beyond the northern edge of its range. Possible explanations for its discovery in Kent include: (a) the adult insect arrived in Britain through natural dispersal – this would not be impossible in a warm summer, but nevertheless seems unlikely; (b) it was transported (alive or dead) in something that the owners of the garden brought back from a visit to southern Europe; or (c) it emerged as an adult from a nymph that had been feeding on the roots of a plant that in turn had been imported into Britain from somewhere within the species' native range. The nymphal stages of *C. orni* feed on the roots of woody plants such as bushes and trees.

HYMENOPTERA

ARCHER, M – Some British aculeate wasps and bees from 2002 and 2003. Chrysididae: *Omalus violaceus* (Scopoli), St Nicholas Fields, York, 23.vi.2003. Tiphidae: *Methocha ichneumonides* Latreille, Highgate Common, Staffordshire, 10.vi.2003. Pompilidae: *Ceropales maculata* (F.), Walney Island, Cumbria, 25.vi.2005, *Arachnospila minutula* (Dahlbom), Chiswick Dunes, Northumbria, 17.vii.2002. Sphecidae: *Crossocerus distinguendus* (Morawitz), Sand Hutton, North Yorkshire, 21.vi.2003; *Crossocerus leucostoma* (L.), Pollington Quarry, East Riding, Yorkshire, 13.vii.2002; *Oxybelus argentatus* Curtis, Sandscale Haws, Cumbria, 26.vi.2003; *Oxybelus mandibularis* Dahlbom, Walney Island, Cumbria, 25.vi.2005; *Dryudella pinguis* (Dahlbom), Holy Island, Northumbria, 17.vi.2003. Vespidae: *Dolichovespula saxonica* (F.), Sand Hutton, North Yorkshire, 30.vii.2002. Colletidae: *Hylaeus signatus* (Panzer), York University, York, 15.vii.2002; *Colletes marginatus* Smith, Upton Dunes, Cornwall, 18.vii.2003; *Lasioglossum quadrinotatum* (Kirby), Rampart Field, Suffolk, 4.ix.2002. Halictidae: *Sphecodes reticulatus* Thomson, Pollington Quarry, East Riding, Yorkshire, 1.ix.2002. Anthophoridae: *Melecta albifrons* (Forster), Reighton Cliffs, North Yorkshire, 1.vi.2003.

BOWDREY, J.P. – A species of gall wasp (Hymenoptera: Cynipidae) new to Essex. *Andricus grossulariae* Giraud, galls on *Quercus cerris* catkins, Hinault Forest, TQ4792, 9.v.2004; gall on *Quercus robur* acorn cup, Chelmsford, TL7006, 29.ix.2004, agamic female expected to emerge spring 2005.

GIBBS, D. – Hymenoptera collected in 2004. Andrenidae: *Andrena proxima* (Kirby), 3.vi, Monk Woods, Somerset, ST7570.

HALSTEAD, A. – (1) Recent records of *Arge berberis* Schrank (Hymenoptera: Argidae), the Berberis sawfly, currently recorded from in and around London but likely to spread.

(2) Some uncommon or local Hymenoptera. Tenthredinidae: *Heptamelus ochroleucus* (Stephens), female, swept, 30.v.2004, Savernake Forest, Wilts., SU2365; *Dolerus anthracinus* (Klug), female, 7.vi.2002, Pinchbeck Fen Slipe, nr Spalding, Lincs., TF1823, col. J. Bratton; *Pristiphora biscais* (Foerster), female, 10.v.2002, south of Pen y Park reservoir, Anglesey, SH5874, col. J. Bratton; *Pristiphora testacea* (Jurine), female, 29.viii.2004, Bonseys Common, nr Woking, Surrey, TQ0161; *Halidamia affinis* (Fallén), male, malaise trap, 15.v.2004, Richmond Park SSSI, col. D. Baldock, males are rare in this species; *Harpiphorus lepidus* (Klug), female, swept from oak, 30.v.2004, Savernake Forest, Wilts., SU2366; *Macrophya rufipes* (L.), female, 4.vi.2004, White Hart Down (east), north-west of Mere, Wilts., col. A. Stubbs; *Hoplocampa rutilicornis* (Klug), female, swept from blackthorn,

17.iv.2004, Great Bookham Common, Surrey, TQ1256; *Amauronematus amentorum* (Foerster), female, swept from sallow, 24.iv.2004, Bourne Fields (west), nr Chobham, Surrey, SU9961; *Amauronematus longiserra* (Thomson), female, swept from sallow, 4.iv.2004, Bourne Fields (west), nr Chobham, Surrey, SU9961; *Nematus fagi* Zaddach, female, swept from beech, 4.vi.2004, west Woods, south-west of Marlborough, Wilts., SU1566; *Pontania herbacae* (Cameron), female, Elidir Fach, nr Dinorwig, Caernarvon, SH6061, bred from galls on *Salix herbacea*, collected by J.Bratton 29.vi.2003, emerged 5.ii.2004. Eumenidae: *Symmorphus crassicornis* (Panzer), male, swept from aspen, 5.vii.2004, Orchid Field, nr Grasslands, Horsell Common, Woking, Surrey, SU9860.

HAWKINS, R.D. – Specimens of *Hedychrum niemelai* Linsenmaier (Chrysididae) taken in Surrey during 2004. Male and female near nests of *Cerceris* spp., 6.vii, Nonsuch Park, Cheam; male at flowers of *Achillea millefolium*, 21.viii, Priory Park, Reigate. The brilliantly coloured female was not described by Morgan (1984, Cuckoo-wasps Hymenoptera, Chrysididae. *Handbooks for the Identification of British Insects* Vol 6, Part 5. RESL). This species is considered as a synonym of *H. nobile* by Kunz (1994, *Die Goldwespen Baden-Württembergs*) and indeed, the male genitalia of both specimens appear to be a better match to *H. nobile* than *H. niemelai*.

JONES, R.A. – Hymenoptera found on brownfields sites in Rochester, Kent. Formicidae: *Hypoponera punctatissima* (Roger), alate female, 1.ix.2004, central Rochester, under dumped old carpet in derelict wharf area. Most records of this secretive ant are from heated buildings, although winged females are sometimes recorded outside in urban areas; *Ponera coarctata* (Latreille), 24.ix.2004, Horniman Museum, collected on an 'ecorooft' by suction sampling. This secretive ant makes small colonies beneath stones and mosses and is more or less restricted to coastal sites in southern England; *Myrmecina graminicola* (Latreille), 1.ix.2004, alate female, central Rochester, swept from derelict overgrown railway sidings. Colletidae: *Hylaeus signatus* (Panzer), 9.vi.2004 and 15.vi.2004, derelict railway sidings, central Rochester. This bee is recorded from various counties in southern Britain, associated with the flowers of *Reseda* sp. on warm sunny sites. Apidae: *Bombus humilis* Illiger, 1.ix.2004, visiting flowers in derelict car park, central Rochester. Once common, this species is known to have declined drastically in the last 50 years.

LOVE, M. & DEWHURST, C. – Hymenoptera. Andrenidae: *Andrena flavipes* Panzer, female, Ellanore Farm, West Wittering, West Sussex, SZ7799, 9.iv.1998. Anthophoridae: *Nomada fucata* Panzer, female, Ellanore Farm, West Wittering, West Sussex, SZ7799, 9.iv.1998, cleptoparasite of the preceding species. Cynipidae: *Andricus aries* (Mayr), Emsworth, West Sussex, SU7505.

ORAM, D.A. – *Cimbex femorata* (L.), a female found at Sutton, Surrey 27.iv.1997. The insect was found resting on the ground approximately 3 m away from a silver birch tree.

DICTYOPTERA

BADMIN, J. – A Praying Mantis *Mantis religiosa* (L.) (Dictyoptera: Mantidae) outdoors in London, 2004. A female individual was found living outdoors on the wall of a house in Brentwood, Middlesex, by the owner Mr David Hillman, in mid-September 2004 and was observed for several days. The mantis was captured and fed daily with flies until dying on the 9.ix.2004. The origin of this insect has not been determined, as neither the house owner nor his immediate neighbours had recently been abroad.

TRICHOPTERA

KILLEBY, M.—Caddis flies recorded in Milton Keynes, Buckinghamshire. The many miles of still and slow moving waters, lakes and damp woodlands make Milton Keynes an excellent area for the study of caddis flies. The exhibit showed adult specimens of some of the 57 species recorded during the last five years by a combination of light trapping and sweeping. Common species were *Limnephilus affinis* (Curtis), *Agrypnia varia* (F.), *Tinodes waeneri* (L.), *Hydropsyche pellucidula* (Curtis) and *Sericostoma personatum* (Spence). *Ceraclea senilis* (Burmeister) was collected on 24.vii.2004 in SP84, a notable species becoming more common as it extends its range northwards.

GENERAL

GIBBS, D.—Araneae collected in 2004. Dictynidae: *Argenna patula* (Simon), 17.v, Havergate Island RSPB Reserve (N. Lagoon), Suffolk, TM4148. An example of a dry-pinned spider prepared by soaking overnight in 2-ethoxyethanol, followed by a few hours in ethyl acetate. Male palp mounted separately in DMHF (dimethyl hydantoin formaldehyde) resin.

HALL, N.M.—Exhibition of a specimen of a *Nemoptera* sp. (Neuroptera: Nemopteridae), Spain, El Pozo del Esparto, Almeria, and illustrations of the logos of the BENHS and the Asociación Española de Entomología, both based on *Nemoptera*. Because of the two-dimensional nature of the logos, they can not show the true shape of the ribbon like hindwings. The tails of these are twisted through 180°, giving the impression that the tails contract along the centre portion.

MERRIFIELD, K. & MERRIFIELD, R.—Some photographs of plant galls. Cottonwood gall on *Quercus* sp. caused by the wasp *Andricus quercusramuli* (L.) (Hymenoptera: Cynipidae), 31.v.2004, Hodson Estate, Chiseldon, Wilts., SU1780; large numbers of pocket plum galls on *Prunus spinosa* L. caused by the fungus *Taphrina pruni* Tul. (Ascomycotina: Taphrinales), 4.vi.2004, Folly Farm Avon Wildlife Trust Reserve, Avon, ST6060; European pear rust on domestic pear *Pyrus* sp. caused by the fungus *Gymnosporangium sabinae* DC (Teliomycetes: Uredinales), ix.2003, Eastcoate, Middlesex, TQ1087.

MILES, S.R.—A poster summarising the results of the Society's 'Heathland flies Project'. This six year study has focused on the biology and habitat requirements of the Heath bee-fly *Bombylius minor* L. and the Mottled Bee-fly *Thyridanthrax fenestratus* (Fallén), both Red data book species. A draft code of practice for the management of heathland paths and tracks in support of these and other localised heathland insects has now been produced and is available from the exhibitor.

SIMPSON, M.L.—The Simpson collection of Entomological Memorabilia. Items exhibited were a Garner's New Killing Bottle, ca.1900 purchased on Ebay, old entomological pins donated by Eric Gowling-Scopes, an oval zinc collecting tin, a zinc sugaring tin with internal brush and fitting for attaching to belt, and a 'Bulls eye' entomologist's lantern made by E.T. Wright of Ontario (last three items donated by Mrs. Chalmers-Hunt).

THE ACULEATE HYMENOPTERA OF HORTON NATIONAL NATURE RESERVE, GOWER, WEST WALES

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ABSTRACT

Horton NNR, Glamorgan (VC41), is highlighted as a site of importance for aculeate Hymenoptera with one hundred and eighteen species so far recorded. *Sphecodes longulus* von Hagens is recorded for the first time in Wales from the reserve, extending its distribution westward from southern England. Other scarce species that occur on the reserve are discussed and a full species list provided.

INTRODUCTION

The aims of this paper are to highlight some of the noteworthy species of aculeate Hymenoptera that occur at Horton National Nature Reserve, species which are not only rare in the county of Glamorgan but are rare in the principality, and to underline the conservation importance of the site in a regional context.

Very little has been published on the aculeate Hymenoptera of Glamorgan since Hallett's 1928 faunal list of the county (Cooter, 1987, Blacker, 1989, Archer, 1992, 1994, Pavett, 1999, Skidmore, 1999). Also, there have been no sites within the county for which a complete list has been published. However, a number of reports commissioned by the Countryside Council of Wales have been written highlighting the importance of certain aculeate species in Wales or of habitats that support them (Fowles, 1994, 1996, Howe, 1998, 2002). There has also been a considerable amount of work undertaken by the UK Biodiversity Action Plan Bumblebee Working Group between 1998 and 2002 (Edwards, 1998, 1999, 2000, 2001, 2002).

SITE DESCRIPTION

Horton National Nature Reserve is situated on the south Gower coast, between Port Eynon to the west and Oxwich Bay to the east and extends for approximately one kilometre along the coast. (Grid reference SS479854–SS492852). The richness of the site is due to a combination of factors. These include the south facing aspect, vital for such warmth-loving insects and the head deposits of periglacial weathered sand, clay and gravel overlying the Carboniferous limestone of the lower slopes which provide a large area of substrate that are ideal for nesting sites. There are also extensive areas of calcareous grassland and maritime heath with a rich flora, that provide pollen and nectar sources and areas in which to hunt other invertebrates as prey. This combination of features makes Horton NNR one of the richest sites for aculeate Hymenoptera in Glamorgan, and indeed, in Wales.

RDB AND NOTABLE SPECIES OCCURRING AT HORTON NNR

There are very few sites in Wales where the aculeate fauna exceeds a hundred species, Horton NNR is one of them, boasting an aculeate fauna of one hundred and

eighteen species. A number of species hold Notable or RDB status, with two RDB2, *Andrena rosae* Panzer, *Cryptocheilus notatus* (Rossius); three RDB3, *Andrena hattorfiana* (F.), *Nomada lathburiana* (Kirby), *Arachnospila consobrina* (Dahlbom); six Na, *Andrena marginata* F., *Eucera longicornis* (L.), *Nomada fucata* Panzer, *Sphecodes longulus* von Hagen, *Leptothorax albipennis* (Curtis), *Oxybelus argentatus* Curtis; and nine Nb, *Andrena trimmerana* (Kirby), *Nomada flavopicta* (Kirby), *Osmia bicolor* (Schrank), *Stelis punctulatissima* (Kirby), *Priocnemis gracilis* Haupt, *Priocnemis schioedtei* Haupt, *Nysson dimidiatus* Jurine, *Podalonia hirsuta* (Scopoli) and *Methocha ichneumonides* Latreille.

SPHECODES LONGULUS NEW TO WALES

Sphecodes longulus von Hagen (Apidae: Halictinae) is a cleptoparasite of *Lasioglossum* species (Apidae: Halictinae), *Lasioglossum minutissimum* (Kirby), *L. morio* (F.) and *L. leucopum* (Kirby) having been cited as possible hosts (Falk, 1991), the latter two species occurring at Horton NNR. *Sphecodes longulus* is regarded as a rare and local species and was considered until recently to be confined to southern England (Falk, 1991). It is most frequently recorded from dry, sandy heathland but also occurs in other sandy areas such as sand pits and coastal cliffs and rarely in open, broadleaved woodland. A single female was taken on *Daucus* alongside the coastal path at Horton on 22.vii.1996, this being the first record for the species from Wales (det. confirmed by M. Edwards). This record greatly extends its distribution into western Britain, see Falk (1991).

NOTABLE HYMENOPTERA

A number of species that occur at Horton NNR are of very restricted distribution in Wales enhancing the value of the reserve. Until recently the only known colony of *Andrena hattorfiana* (F.) in Wales was found to be at Horton NNR where it visits *Knaulia arvensis* (L.) and probably *Scabiosa columbaria* L. for pollen. The species has however, recently been recorded at Caerwent, an abandoned Ministry of Defence site, near to Newport in Gwent by M.A. Howe and about a mile to the west of Horton NNR on the south Gower coast at Overton SSSI by M. Edwards (pers. comm.). The species is far from common on the reserve but does occur in most years, most frequently in odd years, i.e. 2001 & 2003. *Andrena rosae* has only been recorded in Glamorgan from this reserve and from the coastal cliffs at Lavernock in the east of the county (Hallett, 1928). On the 30.iii.2002, I recorded a single male from the reserve.

Nomada lathburiana (Kirby) has only been found once on 26.v.1997 and its host, *Andrena cineraria* (L.) is not common on the reserve. This species seems to be commoner in the north of Glamorgan. *Eucera longicornis* (L.) is common, visiting flowers of *Trifolium*, *Vicia* and *Geranium*. A single *Arachnospila consobrina* (Dahlbom) was recorded on *Daucus* on 26.v.1997. This species, however, is characteristic of dune sites and it is probable that this was a stray individual from the nearby sand dunes of Port Eynon which lie at the western end of Horton NNR. The tiny ant, *Leptothorax albipennis* (Curtis) occurs fairly commonly on the limestone grasslands and screes, often being recorded nesting in the cracks of fallen limestone boulders.

There are four species, *Andrena coitana* (Kirby), *Nomada obtusifrons* Nylander, *Coelioxys rufescens* Lepeletier & Brulle, *Cryptocheilus notatus* (Rossius) that were recorded from Horton in the past which have not been found since the 1920s. Three of these species are still to be found at other sites in Glamorgan but *C. notatus* has

not been recorded from Wales since 1914 (Fowles, 1996) and may now be extinct in the principality. It should be remembered however, that such sites are not static, but that species leave and may recolonise, with populations fluctuating markedly from year to year as habitat and climatic conditions change. In the 1930s H.M. Hallett regarded the bee *Andrena flavipes* Panzer as rare in the county of Glamorgan, and in Wales as a whole, and its cleptoparasite *Nomada fucata* Panzer was unrecorded (Hallett, 1928). Today this *Andrena* is the commonest bee at Horton NNR and the *Nomada*, with the exception of *Nomada marshamella* (Kirby), the most frequently recorded of its genus.

Another example is the anthophorine bee *Melecta albifrons* (Forster), a very scarce species in Wales. For the last fifteen years I have searched a large nesting aggregation of its host, *Anthophora plumipes* (Pallas) at Horton NNR without any success. In the spring of 2001 the *Melecta* was apparently outnumbering the host. Whether this species has always occurred at the site in small numbers, moved in from an undiscovered colony of its host nearby, or has come from farther afield is unknown, the former being the most likely explanation. On the other hand the RDB bee, *A. rosae* was recorded by Hallett on one occasion, July 1914 (Hallett, 1927), and has only been recorded on one occasion since.

Whilst there are many sites in the south and south east of England that have larger aculeate faunas, Horton NNR is one of the most important sites in Wales and western Britain on account of the number of species and associated insects that occur there. It is important, that monitoring and recording continues at Horton NNR, so that, as complete a picture as is possible, may be obtained of this important reserve. It is also important to monitor any changes in the aculeate fauna that may take place and to identify any detrimental changes that may be occurring. A full list of species is given in the Appendix.

INSECTS ASSOCIATED WITH ACULEATE HYMENOPTERA

A number of non-hymenopteran parasitic species that are dependent on the aculeates as hosts for their larvae occur on the reserve. The beetle *Meloe proscarabaeus* L. (Meloidae), which is parasitic primarily on bees of the genera *Anthophora* and *Osmia*, is very common as an adult in the early spring, whilst its triungulins are to be found on a wide variety of bees and wasps during the summer months.

The Diptera form an important component of this fauna. Three species of bee fly, *Bombylius major* L., *B. canescens* Mikan and *B. discolor* Mikan, whose larvae prey upon the larvae and/or pupae of aculeates, are recorded from the site. *Bombylius discolor* is a notable species and Horton NNR supports a good population of this fly, the adult being frequently met with in the early spring.

The Conopidae are a family of flies that are internal parasites of adult bees and wasps. Four species have been recorded at Horton, *Physocephala rufipes* (F.), *Thecophora atra* (F.), the notable *Thecophora fulvipes* Robineau-Desvoidy and *Sicus ferrugineus* (L.). Additional species of interest include the sarcophagid fly *Metopia argyrocephalus* (Meigen) and the RDB hoverfly *Chrysotoxum elegans* Loew which also occur frequently on the reserve. Clearly there is scope for more intensive recording of these groups at Horton.

ACKNOWLEDGEMENT

I would like to express my thanks to Mike Edwards for confirming my identification of *S. longulus* and for his helpful comments regarding this paper.

REFERENCES

- Archer, M.E. 1992. Notable wasps and bees (Hymenoptera, Aculeata) taken on Welsh sand dunes and a plea for help. *Entomologist's Monthly Magazine* **128**: 218.
- Archer, M.E. 1994. A survey of Aculeate wasps and bees (Hymenoptera) on the sand dune systems of south Wales, during 1994. CCW Contract Science. 100. Countryside Council for Wales.
- Blacker, N.C. 1989. The ants (Hymenoptera, Formicidae) of the Gower peninsula, West Glamorgan, South Wales. *Entomologist's Record and Journal of Variation*, **101**: 261–266.
- Cooter, J. 1987. *Symmorphus crassicornis* (Pz.) (Hym., Eumenidae) in S. Wales. *Entomologist's Monthly Magazine* **123**: 54.
- Edwards, M. 1998. UK BAP Bumblebee Working Group Report.
- Edwards, M. 1999. UK BAP Bumblebee Working Group Report.
- Edwards, M. 2000. UK BAP Bumblebee Working Group Report.
- Edwards, M. 2001. UK BAP Bumblebee Working Group Report.
- Edwards, M. 2002. UK BAP Bumblebee Working Group Report.
- Falk, S. 1991. *A review of the scarce and threatened bees, wasps and ants of Great Britain*. Research and Survey in Nature Conservation. No. 35.
- Fowles, A.P. 1994. *Invertebrates of Wales: a review of important sites and species*. Joint Nature Conservation Committee, Peterborough.
- Fowles, A.P. 1994. A review of the ecology of the red wood ant *Formica rufa* L. (Hymenoptera, Formicidae) and its status in Wales. *Countryside Council for Wales*.
- Fowles, A.P. 1996. A provisional checklist of the invertebrates recorded from Wales. 2. Aculeate wasps, bees and ants (Hymenoptera: Aculeata). *Countryside Council for Wales*.
- Hallett, H.M. 1928. The Hymenoptera Aculeata of Glamorgan. *Transactions of the Cardiff Naturalists Society* **60**: 33–67.
- Howe, M.A. 1998. *Countryside Council for Wales Natural Science Report* 98\5\2. Field meeting of the Dipterists Forum at Abergavenny, June 1997.
- Howe, M.A. 2002. *Countryside Council for Wales Natural Science Report* 02\5\1. A Review of the Coastal Soft Rock Resource in Wales, with particular reference to its importance for invertebrates.
- Kloet & Hincks 1978. Handbooks for the identification of British Insects Vol. XI, Part 4. *Royal Entomological Society of London*.
- Pavett, P.M. 1998. Monitoring of bumblebees and other aculeate Hymenoptera populations on the south Gower cliffs. *Countryside Council for Wales Contract Science Report No. 328*.
- Pavett, P.M. 1999. *Crossocerus vagabundus* (Panzer) (Hymenoptera: Sphecidae) in Wales. *British Journal of Entomology and Natural History* **12**: 25.
- Pavett, P.M. & Fowles, A.P. [in prep. To be published 2004] Hallet's Aculeate Hymenoptera of Wales.
- Skidmore, P. 1999. Entomological survey of South Gower Coast nature reserve. Section 2: Overton Cliff 1999, *Glamorgan Wildlife Trust*.

APPENDIX

CHECKLIST OF SPECIES RECORDED FROM HORTON NNR

Species recorded by Hallett which have not been found since are marked with an asterisk*. It should be noted that Hallett made a number of records from "Porteynon", several of which probably refer to Horton, and not to the sand dunes and cliffs at Porteynon, so it was thought better to leave these records out of the checklist. Voucher specimens for all species recorded below are held in the collections of the National Museum of Wales and in P.M.Pavett's private collection.

Apidae – Andreninae

Andrena barbilabris (Kirby), *A. bicolor* F., *A. cineraria* (L.), **A. coitana* (Kirby), *A. denticulata* (Kirby), *A. flavipes* Panzer, *A. fulva* (Müller), *A. haemorrhoea* (F.), *A. hattorfiana* (F.), RDB3, *A. marginata* F., Na, *A. minutula* (Kirby), *A. nigroaenea* (Kirby), *A. ovatula* (Kirby), *A. pubescens* Olivier, *A. rosae* Panzer, RDB2, *A. scotica* Perkins, *A. thoracica* (F.), *A. trimmerana* (Kirby), Nb, *A. wilkella* (Kirby), *Panurgus banksianus* (Kirby), *P. calceatus* (Scopoli).

Apidae–Anthophorinae

Anthophora plumipes (Pallas), *A. furcata* (Panzer), *Eucera longicornis* (L.), Na, *Melecta albifrons* (Forster), *Nomada fabriciana* (L.), *N. flava* Panzer, *N. flavopicta* (Kirby), Nb, *N. fucata* Panzer, Na, *N. goodeniana* (Kirby), *N. lathburiana* (Kirby), RDB3, *N. marshamella* (Kirby), **N. obtusifrons* Nylander, *N. ruficornis* (L.), *N. striata* F.

Apidae–Apinae

Apis mellifera L., *Bombus hortorum* (L.), *B. lapidarius* (L.), *B. jonellus* (Kirby), *B. lucorum* (L.), *Bombus major* L., *B. canescens* Mikan and *B. discolor* Mikan. *B. pascuorum* (Scopoli), *B. terrestris* (L.), *B. campestris* (Panzer).

Apidae–Colletinae

Colletes fodiens (Geoffroy), *C. similis* Schenck, *Hylaeus hyalinatus* Smith.

Apidae–Halictinae

Lasioglossum calceatum (Scopoli), *L. leucopum* (Kirby), *L. leucozonium* (Schränk), *L. morio* (F.), *L. punctatissimum* (Schenck), *L. smaehtmanellum* (Kirby), *Halictus tumulorum* (L.), *Sphecodes ephippius* (L.), *S. geoffrellus* (Kirby), *S. longulus* von Hagen Na, *S. monilicornis* (Kirby).

Apidae–Megachilinae

Anthidium manicatum (L.), **Coelioxys rufescens* Lep. & Serv., *Hoplitis spinulosus* (Kirby), *Megachile maritima* (Kirby), *Osmia bicolor* (Schränk) Nb, *Stelis punctulatissima* (Kirby) Nb.

Bethylidae

Bethylus cephalotes (Foerster), *B. fuscicornis* (Jurine).

Chrysididae

Chrysis ignita (L.), *C. viridula* L., *Omalus auratus* (L.), *Trichrysis cyanea* (L.).

Formicidae

Formica cunicularia Latreille, *Lasius alienus* (Forster), *L. flavus* (F.), *Lasius niger* (L.), *L. umbratus* (Nylander), *Leptothorax albipennis* Curtis Na, *Myrmica scabrinodis* Nylander, *M. ruginodis* Nylander, *Myrmecina graminicola* (Latreille), *Tetramorium caespitum* (L.).

Mutillidae

Myrmosa atra Panzer.

Pompilidae

Anoplus nigerrimus (Scopoli), *A. infuscatus* (Vander Linden), *Arachnospila consobrina* (Dahlbom) RDB3, **Cryptocheilus notatus* (Rossius) RDB2, *Evagates crassicornis* (Shuckard), *Episyron rufipes* (L.), *Pompilius cinereus* (F.), *Priocnemis exaltata* (F.), *P. gracilis* Haupt Nb, *P. parvula* Dahlbom, *P. pusilla* Schiodte, *P. schioedtei* Haupt Nb.

Sapygidae

Sapyga quinquepunctatus (F.).

Sphecidae

Cerceris arenaria (L.), *Crabro cribrarius* (L.), *Crossocerus elongatulus* (Vander Linden), *C. podagricus* (Vander Linden), *C. quadrimaculatus* (F.), *Ectemnius continuus* (F.), *Entomognathus brevis* (Vander Linden), *Gorytes tumidus* (Panzer), *Lindenius albilabris* (F.), *Nysson dimidiatus* Jurine Nb, *N. spinosus* (Forster), *Oxybelus argentatus* Curtis Na, *O. uniglumis* (L.), *Passaloecus gracilis* (Curtis), *Pemphredon lethifer* (Shuckard), *Podalonia hirsuta* Scopoli Nb, *Tachysphex pompiliformis* (Panzer), *Trypoxylon figulus* (L.).

Tiphiidae

Methocha ichneumonides Latreille Nb.

Vespidae

Odyneres spinipes (L.), *Ancistrocerus oiventris* (Wesmael), *A. scoticus* (Curtis), *Dolichovespula norwegica* (F.), *D. sylvestris* (Scopoli), *Paravespula germanica* (F.), *P. vulgaris* (L.).

REVIEW

The Black Flies (Simuliidae) of North America. By Peter H. Adler, Douglas C. Currie & D. Monty Wood. 1072 pages, 255 maps, 888 drawings, 97 b & w photographs, 24 pages of coloured illustrations. Cornell University Press. £57.95 (US\$99.95). ISBN 0-8014-2498-4

This is a landmark publication. Part IV of the book (Systematics and Taxonomy, from page 123 onwards) includes information on all 254 species of blackflies that occur in North America. Before this "meat" the book is introduced by 122 pages of eight fascinating chapters. These cover background material with a short overview, then a remarkable history of research, complete with portraits of blackfly scientists, and a techniques chapter. Next is the biology, divided into three chapters on structure and function, cytology and then behaviour and ecology, followed by two chapters on economic aspects: social and economic impact, and management. To cap it all the illustrations are superb.

Although there is no human onchocerciasis for North American blackflies to transmit, the flies occur there in some areas in such numbers that their biting renders day-to-day outdoor activities unbearable. This nuisance activity has led to much work on the culprits, 33 species being involved, but also on biters of livestock and birds. For the latter, the vectors of the protozoan *Leucocytozoon* spp. are the most important causing economic losses to turkey farmers. Because of such ornithophilic blackflies, the authors have provided a list of species of avian hosts "based on confirmed biting records in the field". But it begins with emu and ostrich so presumably "the field" includes zoos! But, rather than using this as a complaint I prefer it to be remembered as a compliment to the encyclopaedic nature of the book. The accounts, not only of such hosts but also of the various parasites that afflict blackflies (nematodes, microsporidia, true fungi, bacteria, viruses, ectoparasites etc.) are thorough and the authors have compiled a vast and disparate literature into one, albeit large and heavy, book.

Since the pioneering work of the late Klaus Rothfels, whose portrait looks at the reader quizzically on page 19, cytology has dominated blackfly taxonomy with ever more cytospecies and cytoforms overtaking identifications based on morphotaxonomy. This is well explained and illustrated in Chapter 5, but it has not been allowed to dominate the systematics section. Rather, we are given a sensible compromise linking external characters with chromosome data and molecular results. Here the keys "emphasise ease of use rather than phylogenetic arrangement" and there are separate keys for adults, pupae and larvae. In the latter, chromosome data are included but they are not always essential and many identifications can be made without them, which is where the excellent illustrations come in. Once you have run down your specimen, the text provides details of the diagnosis, overview, taxonomy, morphology, cytology, molecular systematics, bionomics (habitat, oviposition, development, mating, natural enemies) and hosts and economic importance. There are distribution maps for every species and 57 pages of references.

This book is a labour of love for which the authors must be congratulated and thanked. Everyone interested in blackflies, will need access to this mine of information, and any entomologists working on the Simuliidae within the North American continent should certainly buy it, as it will become the standard work. Given the variety of topics covered and the importance of blackflies, the book will also be a valuable resource for entomologists of all specialisms.

ROBERT A. CHEKE

EXPANDING NORTHERN RANGES OF AQUATIC INVERTEBRATE SPECIES: A POSSIBLE EFFECT OF CLIMATE CHANGE?

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ABSTRACT

Recent recording of aquatic invertebrate species in north-east England has generated records of a number of species either new to the region or spreading northwards. Two species were found in a brackish water site but 11 others, a mixture of dragonflies, water bugs and beetles, were all recorded from permanent, open ponds with vegetated edges. Aquatic habitat availability has increased in north-east England, mainly as a result of land reclamation of mining operations, but the observed changes of northern ranges of species are likely to be related to temperature rise, in line with other species such as butterflies.

INTRODUCTION

There is a history of intensive recording of aquatic invertebrates in north-east England, especially of water beetles with work carried out in the late 1960s and early 1980s, culminating in the production of a species atlas (Eyre *et al.*, 1985) and habitat definition (Eyre *et al.*, 1986). Water bugs have also received considerable attention (Eyre & Foster, 1989). The records generated in the late 20th century enable temporal comparisons to be made with recent surveys, together with those in a number of recently published atlases.

Survey work in 2002, 2003 and 2004 has generated a number of species distribution records indicating expanding northern British ranges of some species. These records are given below and the observed trends discussed.

NOTEWORTHY RECORDS

GASTROPODA

Assimineidae

Assiminea grayana Fleming

A snail species found at the top of saltmarshes, the records in the atlas of Kerney (1999) show records north to the River Humber estuary. It was found by the coast at Druridge Bay in Northumberland (NZ2798, VC 67) in August 2004 by the outflow of a lake connected to the sea.

ODONATA

Aeshnidae

Aeshna grandis (L.)

Larvae of this species were found in both a small vegetated pond and in an open large lake at Big Waters (NZ2273, 2373, VC 67), just north of Newcastle upon Tyne in May 2004 and in a vegetated pond at Minsteracres (NZ0256, VC 67) in July 2004. These sites are just north of the records given in the dragonfly atlas (Merritt *et al.*, 1996) and may be the first proof of this species breeding in north-east England.

Anax imperator Leach

The most northerly records for this species in Merritt *et al.* (1996) are from the Humber area and south Lancashire coast. Larvae have been found in ponds with sparse edge vegetation at Coatham Sands by the mouth of the River Tees (NZ5725, VC 62), at Portrack Marshes near Stockton (NZ4619, VC 66) in June 2003 and at Favordale, Darlington (NZ2816, VC 66) in September 2003. However, the most northerly record was from Mount Pleasant near Boldon (NZ3461, VC 66), also in June 2003.

Brachytron pratense (Müller)

Although there are records from south-west and central Scotland for this species (Merritt *et al.*, 1996), these are on the west coast of Britain. On the eastern side, the most northerly records are from south Yorkshire. The larvae were found at Cowpen Bewley near Billingham (NZ4825, VC 66) in May 2003 and at Warden Law, west of Sunderland (NZ3750, VC 66) in September 2003.

HEMIPTERA

Corixidae

Hesperocorixa moesta (Fieber)

Huxley (2003) did not map old records for this species from Cumbria, with the most northerly recent record from south Lancashire. It was found in a fishing pond with sparse vegetation at Tursdale (NZ3036, VC 66) in September 2003.

Micronecta scholtzi (Fieber)

This species was found in an urban lake at Silksworth, Sunderland (NZ3754, VC 66) in July 2003 and in a small reservoir near Edmundbyers (NZ0049, VC 66) in July 2004, both man-made water bodies with mainly bare substrata and little vegetation. Huxley (2003) shows records north to the River Humber.

Sigara stagnalis (Leach)

This brackish water species was found in a pool at Druridge Bay (NZ2798, VC 67), sometimes connected to the sea at very high tides. This record is north of those for the Solway area in the west and for the Teesmouth area in eastern England (Huxley, 2003).

Naucoridae

Ilyocoris cimicoides (Linnaeus)

Huxley (2003) indicates that this species occurs as far north as north-east Yorkshire but a nymph was found at Big Waters in south Northumberland (NZ2373, VC 67) in May 2004.

Pleidae

Plea minutissima Leach

This is now a common species in north-east England. It has been found in 2002–2004 at sites in grid squares NZ03, 14, 21, 22, 25, 27, 29, 31, 33, 34, 35, 37, 42, 43, 44 and 52, with the most northerly record from Druridge Bay (NZ2798) in May 2004. However, this expansion is recent as the species was not found during survey work in the 1980s (Eyre & Foster, 1989).

COLEOPTERA

Hygrobiidae

Hygrobia herrmanni (Fabricius)

An example of the squeak beetle was recorded from Brinkburn Pond, Darlington (NZ2816, VC 66) in September 2003. There is a 19th century record from Edinburgh, possibly associated with travelling fairs, but the previous northernmost recent British record was in north Yorkshire in 2002.

Dytiscidae

Laccophilus hyalinus (DeGeer)

This species was first found in north-east England in August 2002 in County Durham (VC 66) at Wingate (NZ4037) and Waldrige Fell (NZ2449), the latter the most northerly British record. It has also been found in this county at Billingham (NZ4623), Tursdale (NZ3135) and Favordale, Darlington (NZ2816) in 2003.

Hydrophilidae

Enochrus melanocephalus (Olivier)

Initially recorded in County Durham from Brinkburn Pond, Darlington (NZ2816) in 1986, this species has since been found in other sites in the county at Brasside Pond (NZ2945) in 1992, at Rainton (NZ3248), Tursdale (NZ3135) and Hylton, Sunderland (NZ3658) in 2002, at Cowpen Bewley (NZ4825) and Billingham (NZ4623) in 2003 and at Quarrington (NZ3337) in 2004. It has also been found in south Northumberland (VC 67) just north of Whitley Bay (NZ3575) in 2003 and at Small Burn (NY9480) and Ellington (NZ2793) in 2004, the latter the most northerly British record.

Laccobius sinuatus Motschulsky

Eyre *et al.* (1985) reported this species from Stargate (NZ1663, VC 66) in 1981 and there were further records in County Durham from New Herrington (NZ3353) in 1991 and Chilton Moor (NZ3248) in 2000. Recent recording has generated more records in this county from Wingate (NZ4037) and Black Hurworth (NZ4134) in 2002 and North Gare (NZ5327), Murton (NZ4046) and Tursdale (NZ3135) in 2003. It was also found at Wallsend (NZ3169) and Cambois (NZ3083), both in south Northumberland (VC 67), in 2002 but the most northerly British records are from a mosaic of ponds next to Druridge Bay (NZ2698/2798/2796/2796) in June and July 2002.

DISCUSSION

There is an obvious trend of aquatic invertebrate species spreading northwards in Britain. The recording of mainly southern British water beetle species in north-east England, such as *Hydroglyphus geminus* (F.) in the mid-19th century and *Dytiscus dimidiatus* Bergstraesser in 1969 (Eyre & Foster, 1984), indicates that there have been previous range expansions and contractions. However, the recent distribution changes across a range of aquatic invertebrate species groups, and with some species recorded from a considerable number of new sites, appear to show a stronger trend than those observed previously.

All the species with expanding ranges had similar habitats, except perhaps for the brackish water snail *A. grayana* and bug *S. stagnalis*. The other species were all recorded from relatively open, permanent ponds with vegetated edges and open

water. There were differences in the extent and coverage of vegetation in the pond edges but the edges tended to be relatively open with considerable bare substratum. Another common factor was that a number of the sites were relatively new and the product of land reclamation or construction for leisure activity. There appears to have been a change away from the pattern of lowland freshwater habitat removal with the provision of these new water bodies, at least in north-east England. The ponds at Tursdale are small square fishing ponds, those at Big Waters and Silksworth the product of deep mine reclamation and those next to Druridge Bay an exercise in wetland habitat construction following opencast coal extraction. As Merritt *et al.* (1996) pointed out, the reclamation of mining sites has produced new ponds and lakes and therefore new aquatic invertebrate habitats.

Houghton *et al.* (1996) predicted increasing British temperatures and there has been much recent work on invertebrate species distribution change relative to British temperatures, especially on butterflies (e.g. Hill *et al.*, 2002). Other work based on the data in national recording schemes has concentrated on the potential effects of temperature rise on distribution change, with, for instance, work with dragonfly and hoverfly species (Eversham & Cooper, 1998; Morris & Ball, 2005). There are considerable problems in using phytophagous invertebrate species as monitors of environmental change because of restricted habitat availability, as Hill *et al.* (2002) pointed out for butterflies. It is possible that predator and scavenging species such as water beetles and dragonflies will be more suitable for assessing environmental change, given sufficient water bodies. The recording of so many aquatic species with expanding northern ranges is in line with observations on other invertebrate groups. The relatively comprehensive coverage of Britain by such recording schemes as those for dragonflies and water beetles, and the ease of sampling and generation of distribution data, mean that observed changes in aquatic invertebrate species distribution patterns are likely to reflect ongoing environmental change.

ACKNOWLEDGEMENT

The authors would like to thank Garth Foster for information on the present knowledge of water beetle species distribution.

REFERENCES

- Eversham, B.C. & Cooper, J.M. 1998. Dragonfly species-richness and temperature: national patterns and latitude trends in Britain. *Odonatologica* **27**: 307–316.
- Eyre, M.D., Ball, S.G. & Foster, G.N. 1985. *An Atlas of the Water Beetles of Northumberland and County Durham*. Hancock Museum, Newcastle upon Tyne.
- Eyre, M.D., Ball, S.G. & Foster, G.N. 1986. An initial classification of the habitats of aquatic Coleoptera in north-east England. *Journal of Applied Ecology* **23**: 841–852.
- Eyre, M.D. & Foster, G.N. 1984. A revision of the aquatic Coleoptera of Northumberland and County Durham. *Entomologist's Gazette* **35**: 111–135.
- Eyre, M.D. & Foster, G.N. 1989. A comparison of aquatic Heteroptera and Coleoptera communities as a basis for environmental assessments in static water sites. *Journal of Applied Entomology* **108**: 355–362.
- Hill, J.K., Thomas, C.D., Fox, R., Telfer, M.G., Willis, S.G., Asher, J., & Huntley, B. 2002. Responses of butterflies to twentieth century climate warming: implications for future ranges. *Proceedings of the Royal Society of London Series B—Biological Sciences* **269**: 2163–2171.

- Houghton, J.T., Meira Filho, L.G., Callander, B.A., Harris, N., Kattenberg, A. & Maskell, K. (eds) 1996. *Climate Change 1995: the science of climate change*. Cambridge University Press, Cambridge.
- Huxley, T. 2003. *Provisional atlas of the British aquatic bugs (Hemiptera, Heteroptera)*. Biological Records Centre, Huntingdon.
- Kerney, M. 1999. *Atlas of the land and freshwater molluscs of Britain and Ireland*. Harley Books, Colchester.
- Merritt, R., Moore, N.W. & Eversham, B.C. 1996. *Atlas of the dragonflies of Britain and Ireland*. HMSO, London.
- Morris, R.K.A. & Ball, S.G. 2005. Sixty years of *Volucella zonaria* (Poda) (Diptera: Syrphidae) in Britain. *British Journal of Entomology and Natural History* 17: 217–227.

SHORT COMMUNICATION

A contribution to the distribution of *Zicrona caerulea* (L.) (Hemiptera: Pentatomidae) in Scotland.—The small bright blue plant-bug, *Zicrona caerulea* (L.) is unlikely to be overlooked—or is it? Its distribution seems to be poorly documented. In spite of Southwood and Leston (1956, *Land and Water Bugs of the British Isles*) giving the distribution of *Z. caerulea* as “most areas of Britain”, and both Bedwell (*Entomologist's Monthly Magazine* 81 (1945), 253–273) and Massee (*ibid.* 91 (1955), 7–27) recording the species from “Scotland”, we can find only a single Scottish locality recorded in the literature viz. I. Patterson reported larvae on bramble near Ayton (VC81, Berwickshire), 14.viii.1961 (see McNeill, *History of the Berwickshire Naturalists' Club* 36 (2) (1963[1964]), 175–183). In spite of this the National Museums of Scotland's collections contain a number of specimens from Scottish localities, namely:

- VC73 Gatehouse of Fleet, vi.1946 (D. E. McK. Kevan coll.)
- VC82 Garvald, 2.vii.1951 (A. Clarke coll.)
- VC83 Edinburgh, pre-1858 (R. K. Greville coll.)
- VC85 Kinross, 12.viii.1940 (D. E. McK. Kevan coll.)
- VC89 Kirkmichael, 16.viii.1937 (R. W. Brown coll.)
- VC90 Tarfside, 13.vi.1958 (T. Huxley coll.)
- VC96 Newtonmore, vi.1903 (J. E. Black coll.)

To these can be added further records by the authors, namely:

- VC79 Williamshope, 29.v.1994 (K.P.B.)
- VC86 Dunmore Moss, 3 & 4.viii.1982 (R.M.L.)
- VC89 Lower slopes of Beinn a'Ghlo, 29.vi.1986 (R.M.L.)

The species is thus widely distributed throughout the southern half of Scotland but is always very local.—K. P. BLAND, National Museums of Scotland, Edinburgh EH1 1JF and R. M. LYSZKOWSKI, “Glenwood”, 57 Henderson Street, Bridge of Allan, Stirling FK9 4HG

SHORT COMMUNICATION

Nomada signata Jurine (Hymenoptera: Apidae) in Wales. – *Nomada signata* is a cleptoparasite of the common mining bee *Andrena fulva* (Müller). Nesting of the host occurs in light soils in warm and sunny situations, particularly along well trodden paths, on lawns and other short cropped or sparsely vegetated areas. The host, *A. fulva*, is particularly common in parks and other suburban areas but it would appear that *N. signata* does not favour these situations (Falk, 1991; Fowles, 1996).

In the past, *N. signata* was rare but widespread in the southern half of Britain being recorded from eighteen vice-counties, but in recent times it has become very rare and is accorded RDB2 status. Both Falk (1991) and Fowles (1996) refer to only three post-1970 records for this species, Falk stating "This species has declined greatly, with post-1970 records confined to three sites in S. Hampshire, Herefordshire and Glamorganshire". However, the decline, though alarming, may not be as great as Falk and Fowles intimate as it has been recorded from several other vice-counties (M. Edwards pers. comm.). Certainly this is the case for south Wales with a number of recently reported occurrences.

In Wales, *N. signata* has to date, only been recorded from Monmouthshire (vc 35) and Glamorganshire (vc 41) with the greatest concentration of records from suburban areas in the Cardiff district. The species was first recorded from Wales around 1897 by R. C. L. Perkins at Raglan Vicarage in Monmouthshire. It was further recorded from this county at Abergavenny on the 15.v.1992 by Robert Paxton. Paxton also recorded it from Bute Park, Cardiff on the 5.v.1987 and again on the 21.v.1987. He again recorded the species in the Cardiff district on the 1.v.1988 and 18.iii.1993, the latter record from a suburban garden. During 2002, numerous visits were made to Bute Park by the author but only a single male *N. signata* was recorded, though its host was very common. On the 4.v.2002 the author was recording aculeates on the mountainside above the village of Cwmbach near Aberdare, Glamorgan, when he took a male and female of this species flying among *Erica* and *Vaccinium* in company with *Bombus monticola* Smith and *Andrena wilkella* (Kirby). Its host at this site must be very scarce and localised as I have recorded within this area for over ten years and have never seen it. The full set of Welsh records is summarised in the table below.

I would like to express my sincere thanks to R. Paxton, Zoologisches Institut, Universität Tübingen, for sending his records of this species and to M. Edwards for his comments on the subject. – P. M. PAVETT, Department of Biodiversity & Systematic Biology, National Museums & Galleries of Wales, Cardiff CF10 3NP.

REFERENCES

- Falk, S. 1991. *A review of the scarce and threatened bees, wasps and ants of Great Britain. Research and Survey in Nature Conservation*. No. 35.
 Fowles, A. P. 1996. *A provisional checklist of the invertebrates recorded from Wales. 2. Aculeate wasps, bees and ants (Hymenoptera: Aculeata)*. Nature Conservancy Council, UK

Summary of Welsh Records

35	Raglan Vicarage	SO40	c. 1897	R. C. L. Perkins
35	Sugar Loaf Mt, Abergavenny	SO277180	15.v.1992	R. Paxton
41	Bute Park, Cardiff	ST171778	7.v.1987	R. Paxton
41	Bute Park, Cardiff	ST171778	21.v.1987	R. Paxton
41	Cardiff	ST197777	1.v.1988	R. Paxton
41	Cardiff, Cathays	ST178787	18.iii.1993	R. Paxton
41	Bute Park, Cardiff	ST173777	3.v.2002	P. M. Pavett
41	Cwmbach, mountain	SO027032	4.v.2002	P. M. Pavett

BOOK REVIEWS

The Moths of Essex. By B. Goodey. (Lopinga Books, 2004). 362 pp. Softback £19.75. ISBN 0-9530362-5-1.

The book contains an appreciation of the late A. Maitland Emmet followed by chapters on Essex and its moths, Fisher's Estuarine moth—an Essex speciality, Recent population trends—the view from my garden, Long term moth-monitoring at Writtle College, Introducing the species accounts, Species accounts, Species excluded from the species accounts, Recorders plus references and a species index. All of the guest chapters are interesting to read and that by Dr Ringwood summarising the findings from her PhD thesis research into the ecology of Fisher's Estuarine moth (*Gortyna borellii* ssp. *lunata* Freyer) is particularly informative and well written. The main part of the work is the distribution maps and related data.

With some 1,849 species to cover, there is necessarily a trade-off between the amount of detail that can be included and the size of the resultant book. The author opted to use maps and minimalist text summarised under four icons representing larval food-plant, habitat, status and flight time. For the very rarest taxa the records are given. The maps show dots for the distribution from 1990 onwards and the 10-km squares are shaded to show the historical range with light shading representing pre-1960 and dark shading for 1960–1989. In general, I thought this worked rather well. The dots themselves are at tetrad level for the macros and 5-km for micros, reflecting the usually smaller data sets. The maps for micros were thus smaller (27 mm long) than those for macros (43 mm long). From my experience (in Kent) a few species of micros, and most of the Pyrales, have a reasonable number of records and I would like to have seen some of these at tetrad level rather than slavishly follow a formula, even at the price of loss of uniformity. The dots themselves were of three types to indicate the number of underlying records. This is an important issue and it is pleasing to see it tackled. The results however, especially with the very small maps but even at tetrad level, took some getting used to. With practice the maps could be interpreted but the overall effect was to confuse with too much detail. Where there was enough data, the phenology was shown as a vertical graph beside the distribution map and the flight icon omitted. I greatly appreciated this but found the vertical format a positive irritation. Worse still, when turned sideways, the dates ran backwards from December to January. With some small adaptations, this general idea could well prove popular and be adopted more widely.

Most of the macros, and a proportion of the micros, are illustrated with black and white photographs of the imago in life, all but one from Essex examples. The greatest failing in the work is that the names have been switched in far too many instances (Six-striped Rustic/Gothic on page 277, Bright-line Brown-eye/Clay on page 288, Angle Shades/Olive on page 308, Dunbar/Lesser-spotted Pinion on page 309 to mention but a few). These should be glaringly obvious to most entomologists – including the proofreaders! – but could cause confusion to general readers. A few photographs were either not of the most typical form or possibly incorrect. I do not see the point of pictures for the macros, as good colour illustrations are available in other works (e.g. Skinner, 1998; Waring & Townsend, 2003). With the micros, there is some point in illustrating a few as they are not covered by any single work and fewer people are familiar with them. The illustration of *Coleophora follicularis* (Vallot) on page 89 is clearly of a larval case, but this is not stated anywhere, and the details are well separated being given on page 95. Even then, no distinguishing features of this rare species are mentioned.

With confidence in the proofreading challenged by the photograph captions, it was worrying to notice a few funny quirks in the species accounts. For example, the larval food-plant of the Black-veined Moth is given as "unknown*" on page 245. It has clearly been established that it uses Marjoram, etc. and says so on page 187 of Waring & Townsend; the "*" indicates that Essex data were not available so standard textbooks had been consulted, but evidently not in this instance. It was pleasing to see the "unconfirmed" species treated in a separate section rather than confuse the picture with numerous records of clearly doubtful authenticity. Some mention of these doubtful records is essential lest others think they have been overlooked rather than discarded but treating them in the same manner as valid records gives a distorted picture. It is a pity that compilers of checklists do not follow similar conventions. Scientific names are included in the index with the genus first but many lepidopterists remember far more specific names than generic ones so this proved tedious. Given that the best part of 1,900 species of Lepidoptera were covered, it seems a little odd to omit 50 or so day-flying specialist species just because they are called butterflies.

Overall, I liked the work and think it useful. It has made a brave and innovative, if not wholly successful, attempt to push out the boundaries a little on mapping data but I would have cheerfully dispensed with the photographs, especially of the macros, and used the space created to give a little more interpretation. For this you have to go back to the earlier, and now out of date *The Smaller Moths of Essex* (Emmet, 1981) and *The Larger Moths and Butterflies of Essex* (Emmet *et al.*, 1985). The latter publication, despite its title, also contains an update on the micros.

IAN FERGUSON

REFERENCES

- Emmet, A.M. 1981. *The smaller moths of Essex*. 158 pp. Essex Field Club.
 Emmet, A.M., Pyman, G.A. & Corke, D. 1985. *The larger moths and butterflies of Essex*. 90 pp. Essex Field Club.
 Skinner, B. 1998. *The colour identification guide to moths of the British Isles*. 276 pp. Viking, London.
 Waring, P. & Townsend, M. 2003. *Field guide to the moths of Great Britain and Ireland*. 432 pp. British Wildlife Publishing, Hook.

The Auchenorrhyncha of Central Europe. Volume 1: Fulgoromorpha, Cicadomorpha excl. Cicadellidae by W.E. Holzinger, I. Kammerlander & H. Nickel. (Brill NV, Leiden, 2003). 673pp. Hardback £99.00. ISSN 1570-775X.

This is the first of three planned volumes on the taxonomy of the Auchenorrhyncha (leafhoppers and planthoppers) of central Europe and is a valuable addition to the literature since the keys published by Haupt (1935) and Melichar (1896). All British species are covered in the text. Unlike its predecessors this treatise is published in two languages, with each page divided vertically, English on the left and German on the right-hand side. This format may have resulted in a slight reduction in the length of the keys and descriptions, but no significant problems leading to incorrect diagnoses are apparent. Indeed, simplicity in keys is to be applauded and often of great benefit, since unnecessary time is often spent unravelling the many either/or combinations of couplets that run to full-length paragraphs.

Keys allow easy identification to the 250 species reported from central and northern Europe, including the UK. Species identification is helped by 284 superb

b/w illustrations and 700 colour photographs covering most described species. The whole-insect colour microphotographs are a novel feature and work pretty well. Colour plates of butterflies and moths are relatively easy to accomplish by comparison, as many specimens can be laid out together, and so long as their wings are in a common plane, one photograph will include as many as 90 individuals in perfect focus (vis. *Colour Identification Guide to Moths of the British Isles*, B. Skinner, photographs by David Wilson). This approach is not possible with Auchenorrhyncha for the simple reason that most species are relatively small (< 1 cm) and the standard mounting procedure involves staging insects on micro-pins with their wings folded around the body. Each species has therefore been photographed separately, either dorsally to show body shape and antennal features, or laterally to show additional face and leg characters. Each plate comprises up to 20 insect images laid out on a white background. Having whole insect images for the first time is a luxury which cannot be understated (RES Handbooks have only one whole insect illustration per book, on the front cover) and with photos of related species arranged on the same plate it is possible to identify minute morphological differences between species that cannot be explained easily in words.

Each species account includes the currently recognised scientific name and authority, synonyms and relevant literature. Body length is given for both macropterous and brachypterous individuals. Brief ecological and biological data (time of adult occurrence, overwintering stage, number of generations, hostplants) are based mainly on Nickel (2003). Distribution maps are in the form of dots for rare species and shaded areas for more widespread species. The maps are a broad brush approach, born out of necessity as they cover a large area of Europe, and do not contain the intriguing detail of dot maps familiar to British entomologists. Perhaps we will see some more detailed maps in the future, as these undoubtedly act as stimuli to field entomologists.

This book is obviously an important volume on European Auchenorrhyncha and is likely to set the standard for many years to come. The authors are to be congratulated. The authors consider conservation to be important and at the end of the book provide a complete listing of common German names for each species. This need appears to be a common one that crosses national boundaries and I have succumbed too, naming one rare leafhopper, Colonel Duffield's Sharpshooter (*Aphrodes duffieldi* Le Quesne) albeit somewhat tongue in cheek. At some stage it would be useful to have a translation of these common names so that we might consider adopting them in the UK. However I feel confident that fellow entomologists will continue to converse in perfect Latin for many years to come, so long as we understand each other's accents.

JOHN BADMIN

Night visions: the secret designs of moths by Joseph Scheer. (Prestel Publishing, London, 2003). 120pp. Hard cover £29.99. ISBN 3-7913-2968-5.

Most of the books reviewed in this journal fall into the category of purely scientific, as by one means or another they assist us in identifying or understanding more about the insects we are interested in. We take for granted that insects are fabulously beautiful or totally weird – we just love studying them. From time to time those with an artistic bent turn their attention to the world of insects and fall in love too. The Royal Entomological Society recently promoted a show "Insects and Art" at Plymouth University which attracted large audiences and may tour the U.K.

Artists in residence showed how insect shapes could be incorporated in modern designs. Insects come in a fantastically amazing range of shapes and colours, largely unseen and unappreciated by most of mankind.

Professor Scheer's book is a testament to the beauty of moths. His journey started when his Department of Electronic Art at Alfred University, New York received a high resolution Creo scanner and an Iris printer, designed for high quality commercial colour printing (86 × 117 cm prints). Once set up and prompted with the words "ready to scan", he panicked a little and then his eyes alighted on a small gnat flying round a potted plant, which he captured and scanned at maximum resolution. Even though it was a fly he was amazed by the metallic pearlescent wings, microstructure of the compound eyes and arrangement of body hairs. His interest soon expanded to include other insect Orders and finally moths. This book contains over 200 fine art prints of North American moths of stunning beauty (some extend over two pages – one metre in width). Even a tiny plume moth *Geina tenuidactyla* is in perfect focus at >40cm diameter (×40) showing the minutest details of wing sculpturing and microtrichia arrangements. The author has now extended his interests to studying moth biodiversity and cataloguing photographically moths found in his native land. This is a book to enjoy and browse through from time to time, to remind yourself just how lucky you are to be an entomologist.

JOHN BADMIN

The Insects. An Outline of Entomology (3rd edition) by P.J. Gullan & P.S. Cranston. (Blackwell Publishing, Oxford, 2005). 505 pp. Hardback £29.99. ISBN 1-4051-1113-5.

Whilst I cherish my 'General Textbook of Entomology by O.W. Richards and R.G. Davies', as my bible on insects, I have to admit this new textbook is a superb replacement for learning entomological facts. All aspects of insect biology are covered including anatomy, physiology, taxonomy, development, behaviour and ecology. Written in an accessible style, the book includes boxes highlighting key themes, suggestions for further reading, and is extensively illustrated with wonderful drawings by Hansen McInnes. The relatively few colour plates are of very high quality.

This third edition contains new chapters on insect phylogeny and evolution, a systematic review of the 'new' Order Mantophasmatodea, and successful strategies for insect conservation. Insects are not merely names to be crossed off recording cards, there is a lot to learn about the biology of what is the dominant form of life on earth and this is a very useful book to begin the study of entomology. This remains the standard text.

J. S. BADMIN

THE SOCIETY'S BUILDING MANAGER

We are sorry to report that David Wedd has had to resign from the post of Building Manager because he has moved to the Channel Islands. After three years in this post, in the course of which he has done a magnificent job, we are sure that members will join the Council in thanking David and wishing him well in his new location.

The Society is now seeking a member who can take over the duties of manager of the Pelham-Clinton Building at Dinton Pastures Country Park near Reading. The basic duties are, (i) making regular inspections of the building to ensure that all services are functioning correctly, (ii) opening the building for maintenance of the air conditioning and alarm systems (two planned visits each per year) and for meter reading, (iii) keeping the interior of the building clean and tidy and ensuring a supply of consumable items, (iv) liaising with the staff of the Country Park, (v) attending the Society's Council meetings. In addition it would be helpful if the Building Manager was able to be one of the official keyholders (to be able to open the building at the request of the Emergency Services) and could, at times convenient to him/her, open the building for members wishing to visit the Library and Collections other than on Open Days. The Building Manager is assisted in all these duties by other members. The Building Manager is an Officer of the Society and a member of the Society's Council. A benefit of the post is that the holder has access to the Society's Library and Collections at all times.

Ideally the Building Manager would be retired or self-employed, as visits during working hours are required, and live within 20 minutes travelling time of Dinton Pastures. If members were interested in sharing the job with others, this could be arranged. If you wish to know more or would be interested in becoming Building Manager then please contact the Honorary Secretary, Dr John Muggleton, 17 Chantry Road, Wilton, Salisbury, SP2 0LT, tel. 01722 741487 or email Jmuggleton@aol.com.

CORRIGENDUM

Re: Lin, Y.-C., James, R. & Dolman, P. M. (2005) Are pitfalls biased? A comparison of carabid composition from pitfall trapping and hand searching in forest habitats. *The British Journal of Entomology and Natural History* **18**: 17–25.

In the footnotes of Table 1 and Table 2 of the above paper, the first author wrote “(*) species with British distribution mainly restricted to Breckland, according to Collier (1995) and Luff (pers. comm.)”. This remark on the carabid species UK distribution is incorrect due to my misreading the report by Collier (1995) and miscommunication with Dr Luff. The five species denoted with (*) in the Tables were described as having “strong association with dry grassland heath in Breckland, based on Norfolk records but also found in other suitable habitats” [i.e. elsewhere in UK] in the report by Collier (1995). I wish to offer my sincere apologies to Mr M. Collier and Dr M. Luff for my mistake and also to the readers of the journal for any confusion caused by the footnotes.

YING-CHI LIN



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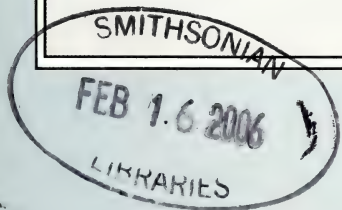
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BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY



BRITISH JOURNAL OF ENTOMOLOGY AND NATURAL HISTORY

Published by the British Entomological and Natural History Society
and incorporating its Proceedings and Transactions

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Typeset by Dobbie Typesetting Limited, Tavistock, Devon.

Printed in England by Henry Ling Ltd, Dorchester, Dorset.

BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

Registered charity number: 213149

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Cover photograph: Marsh Fritillary, *Eurodryas aurinia* (Rott.), gynandromorph, bred by K. Bailey and exhibited at the BENHS Annual Exhibition, 12 November 2005. Photo: R.A. Jones.

NOTE: The Editor invites submission of photographs for black and white reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions can be in the form of colour or black and white prints or colour transparencies.

MISCOPHUS BICOLOR JURINE (HYMENOPTERA: CRABRONIDAE), A WASP NEW TO BRITAIN

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ABSTRACT

Richards (1980) includes only two species of sphecoid wasp within the genus *Miscophus* as having been recorded from the British Isles. This paper records a third, *M. bicolor* Jurine, as new to the British list. A key to allow for the separation of the three British species is presented.

MISCOPHUS BICOLOR JURINE, 1807, IN BRITAIN

During the summer of 2003, A. Knowles paid a series of visits to Maidscross Hill Site of Special Scientific Interest (SSSI), vice county West Suffolk, at the request of Forest Heath District Council, to gather base-line data on the aculeate Hymenoptera to be found there. Maidscross Hill is a renowned botanical site located at Ordnance Survey grid reference TL 7282 adjacent to Lakenheath village and the American airbase at RAF Lakenheath. The site comprises a gravel-topped hill, with chalk coming to the surface in places, as is typical in the Brecks. It supports many Breckland grassland specialities, such as the plants Sand Catchfly *Silene conica*, Spanish Catchfly *S. otites*, Sand Cat's-tail *Phleum arenarium* and Wild Grape Hyacinth *Muscari neglectum*. Many of these plants grow on hummocky, sparsely vegetated ground associated with old gravel-extraction operations, providing conditions that ought to also favour ground-nesting aculeate Hymenoptera.

The most threatened British insects were originally listed in a national Red Data Book (usually shortened to RDB) by Shirt (1987), noting species as being Endangered (RDB1), Vulnerable (RDB2) or Rare (RDB3). Revisions to the statuses of the Hymenoptera were subsequently proposed by Falk (1991), including assessments of less threatened Nationally Scarce species. Preliminary results from this present survey suggest that a diverse and important aculeate fauna does indeed exist at Maidscross Hill, with records for several such Red Data Book or Nationally Scarce species, namely:

Chrysis gracillima Förster, Red Data Book category 2 (Vulnerable), a new county record.

Andrena alfkenella R.C.L. Perkins, RDB3 (Rare).

Cerceris quinquefasciata (Rossi), RDB3 (Rare); a national Biodiversity Action Plan species and a subject of English Nature's Species Recovery Programme.

Halictus confusus Smith, RDB3 (Rare).

Colletes marginatus F. Smith, listed as RDB3 (Rare) in Shirt (1987) but proposed as Nationally Scarce (Na) in Falk (1991).

Oxybelus argentatus Curtis, proposed as Nationally Scarce (Na) (Falk, 1991).

Megachile dorsalis Pérez and *Osmia bicolor* (Schränk), both proposed Nationally Scarce (Nb) (Falk, 1991).

On 9 July 2003 numerous aculeates were collected, including material from temporary pan traps. Not until the specimens were taken away for determination was it seen that the catch included a large female *Miscophus* with prominent orange-red markings on the gaster. Reference to Richards (1980) indicated that the only British *Miscophus* in which the female has red abdominal segments is *M. concolor* Dahlbom, but the specimen clearly did not match this species in terms of size, the extent of red on the abdomen, wing venation and also details of propodeal sculpturing. The specimen was suggested to be *Miscophus bicolor* Jurine by P. Harvey, a view which was supported by G.R. Else at the Natural History Museum, London (NHML) and finally confirmed by Professor S. Gayubo of the University of Salamanca in Spain, to whom our thanks are due.

CHECKLIST OF THE BRITISH SPECIES OF *MISCOPHUS*

The following checklist provides a revision to that given in Richards (1980).

Miscophus Jurine, 1807

ater Lepeletier, 1845

maritimus, F. Smith, 1858

bicolor Jurine, 1807

concolor Dahlbom, 1844

bicolor, F. Smith, 1858 misident.

IDENTIFICATION OF *MISCOPHUS BICOLOR*

Superficially, both sexes of *M. bicolor* show similarities to *M. concolor* females, in that the gaster has a greater or lesser degree of orange/red coloration, whereas the gaster of *M. concolor* males is generally at best orange-brown or even only orange-brown marked basally. In *M. ater* Lepeletier the gaster is entirely black in both sexes. However, *M. bicolor* is generally larger than *M. concolor* and there are differences in the proportions of the size of the second cubital cell in relation to its petiole and also in the sculpturing of the dorsal surface of the propodeum. Bitsch *et al.* (2001) separate *M. concolor* from *M. bicolor* (along with other species not found in Britain) using several characters, including differences in the puncturation of the mesopleuron but reference to the collection of these species held at the NHML suggested that this feature was difficult to discern and discriminate between, especially with poorly mounted or old specimens. Dollfuss (1991) also uses this mesopleuron character, along with the relative length of the petiole of the second submarginal cell in relation to the height of that cell. Differences in the sculpturing of the dorsal surface of the propodeum are also noted. Examination of the material at the NHML suggests that the submarginal cell and its petiole is a reliable character, even though the precise ratio between the two is quite variable and care needs to be taken to examine both wings. However, for the British species, the sculpturing of the dorsum of the propodeum is suggested as a clear and easy discriminator between *M. concolor* and *M. bicolor*.

The following is presented as a key for the British species of *Miscophus*, based on the material held at the NHML. Characters for *M. bicolor* females are taken from the Lakenheath specimen, but confirmation of these characters, and also those for males, is based upon continental material, mainly from France, Israel and Eastern Europe. The authors would welcome comments based on reference collections elsewhere in the country, particularly concerning other specimens of *M. bicolor* that might have gone previously unnoticed.

- 1 Females 2
– Males 4
- 2 All gastral tergites black. **ater**
– At least first gastral tergite orange-red. 3
- 3 Dorsal surface of propodeum with slightly oblique but essentially longitudinal ridges predominating, occasionally with weak lateral branches (Fig. 1a). Petiole of second submarginal generally roughly equal to, or slightly longer than, the height of the cell (Fig. 1b) (check both wings). First, and usually the second gastral tergites, orange-red in colour **concolor**
– Dorsal surface of propodeum with strong transverse or widely oblique ridges, with short, irregular but strong lateral branches, giving an overall coarse reticulate appearance (Fig. 1c). Petiole of second submarginal usually distinctly shorter than the height of the cell (Fig. 1d). First three and occasionally the fourth gastral tergites marked with orange-red **bicolor**
- 4 First two (and occasionally third) gastral tergites distinctly orange-red **bicolor**
– At most, the first gastral tergite orange-brown, occasionally only thus coloured at the base close to the gaster articulation with the propodeum. Otherwise, gaster entirely black. 5

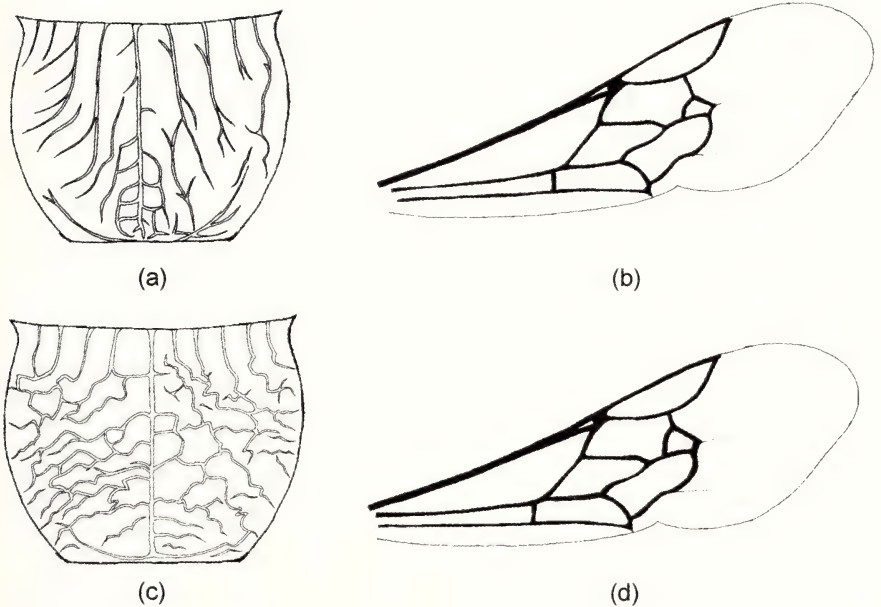


Figure 1. (a) *Miscophus concolor* ♀, propodeal dorsum; (b) *Miscophus concolor* ♀, venation of forewing, showing long petiole of second submarginal cell; (c) *Miscophus bicolor* ♀, propodeal dorsum; (d) *Miscophus bicolor* ♀, venation of forewing; note shorter petiole of second submarginal cell.

- 5 Gaster entirely black. [Upper frons surrounding and in front of the anterior ocellus very densely punctate so that they are generally separated by ridges, with faintly reticulate interstices]. **ater**
- Gaster often with some orange-brown coloration on the first tergite, although this may be much reduced. [Upper frons surrounding and in front of anterior ocellus less densely punctate, so that the punctures are separated by narrow but distinctly flattened, smooth and shiny interstices] **concolor**

EUROPEAN CONTEXT

The NHML has specimens of *M. bicolor* from France, Spain, Austria, Switzerland, Greece, Cyprus, Israel, Turkey, Bulgaria and Sicily. Bitsch *et al.* (2001) add Iran, Syria and Kazakhstan, whilst Dollfuss (1991) notes its presence also in north Africa, from Algeria. Bitsch *et al.* show the species to be quite widely distributed across France, but it would appear that this species is, if native to Britain, at the extreme northwestern edge of its range in Europe.

ADDENDUM

On July 12th 2005 Adrian Knowles re-visited Maidscross Hill in an attempt to establish whether or not the wasp was still present on the site. Using small yellow plate pan-traps and hand-netting it soon became apparent that a healthy and widespread population was present, with 13 males and 3 females being collected in only 2 hours, with many more individuals being seen but not taken. It would therefore appear that this wasp is at the very least well established if not a long-overlooked native species.

It appeared to favour moderately steep (at least 45 degree) slopes with a southerly aspect and sparse vegetation cover, principally Sheep's Sorrel *Rumex acetosella* and small tufts of grasses. The majority of the specimens observed were males, moving over the ground in a rather agitated manner, rather reminiscent of a pompilid wasp, although readily taking to the air when disturbed.

ACKNOWLEDGEMENTS

The authors would like to thank Professor S.F. Gayubo of Salamanca, Spain for confirming the identity of the specimen and also B. Pinchen for providing the illustrations.

REFERENCES

- Bitsch, J., Dollfuss, H., Bouček, Z., Schmidt, K., Schmid-Egger, C., Gayubo, S.F., Antropov, A.V. & Barbier, Y. 2001. *Hyménoptères Sphecidae D'Europe Occidentale* Vol. 3. Faune de France, France et Régions Limitrophes **86**: 1–459.
- Dollfuss, H. 1991. Bestimmungsschlüssel der Grabwespen Nord- und Zentraleuropas (Hymenoptera, Sphecidae) mit speziellen Angaben zur Grabwespenfauna Oesterreichs. *Staphia* **24**: 1–247.
- Falk, S. J. 1991. *A review of the scarce and threatened bees, wasps and ants of Great Britain*. Research and Survey in Nature Conservation, No. 35. Peterborough: Nature Conservancy Council.
- Richards, O.W. 1980. Scoliioidea, Vespoidea and Sphecoidea, Hymenoptera, Aculeata, *Handbooks for the Identification of British Insects*. Vol. 6, Part 3(b), Royal Entomological Society of London, London.
- Shirt, D.B. (Ed.) 1987. *Insects. British Red Data Books*, **2**. Nature Conservancy Council, Peterborough.

THE HEMIPTERA OF BRACKNELL AS AN EXAMPLE OF BIODIVERSITY WITHIN AN URBAN ENVIRONMENT

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ABSTRACT

There is a relative lack of information regarding the biodiversity of arthropods within urban areas. In this study an initial assessment was made of the species richness of Hemiptera on roundabouts within the town of Bracknell. Hemiptera were collected from grassland using suction sampling and from arboreal habitats using a tree beating technique. Comparison of species-richness estimators indicated that the Jack-knife 1 was the best suited for this system. A total of 138 species was recorded, although comparison of estimated and observed species-richness indicated that 52 more species may have been present but un-recorded. An additional 49 species, recorded at other times, are known from the town, giving an known species richness of 187. Overall, even with relatively limited sampling, it is estimated that Bracknell supports at least 20% of the UK's Hemiptera species.

INTRODUCTION

With the exception of work on synanthropic pest species, the study of insects and other arthropods within urban environments has been a relatively neglected area of study, despite the large and ever increasing size of such areas (Davis, 1976; McIntyre, 2000; McIntyre *et al.*, 2001). Those studies that have been published have reported that considerable insect biodiversity exists within towns and cities (Davis, 1976, 1978; Zapparoli, 1997; McIntyre, 2000).

Urban areas consist of a heterogenous mixture of habitat types such as buildings, transport infrastructure, parks, gardens and unused areas sometimes referred to as waste ground (Owen & Owen, 1975; Zapparoli, 1997; McIntyre, 2000). These of course vary in their species richness and diversity, and the overall balance between land use types has an important effect on the relative biodiversity of different parts of urban areas (Davis, 1978; McIntyre, 2000). Within each habitat or habitat patch many factors have been suggested as important in determining the relative species richness and diversity including the levels of isolation and fragmentation, management practices, disturbance, and habitat type, age, area, diversity and connectivity, as well as the characteristics, such as relative mobility, of different taxonomic groups (Davis, 1976; Davis & Glick, 1978; Zapparoli, 1997; Denys & Schmidt, 1998; Fernandez-Juricic, 2000; McIntyre, 2000; Savard *et al.*, 2000; Rudd *et al.*, 2002; Whitmore *et al.*, 2002).

Species-richness is one of the most important and frequently used measures of biodiversity (Magurran, 2004). Quantifying the total species-richness of a given study system is however, frequently difficult and costly. Consequently it is common practice to employ species-richness estimation methods to gain a measure of the true species richness from a limited number of replicated samples (Foggo *et al.*, 2003; Petersen & Meier, 2003; Magurran, 2004). A number of these estimation methods have been developed, including a range of non-parametric estimators (Colwell &

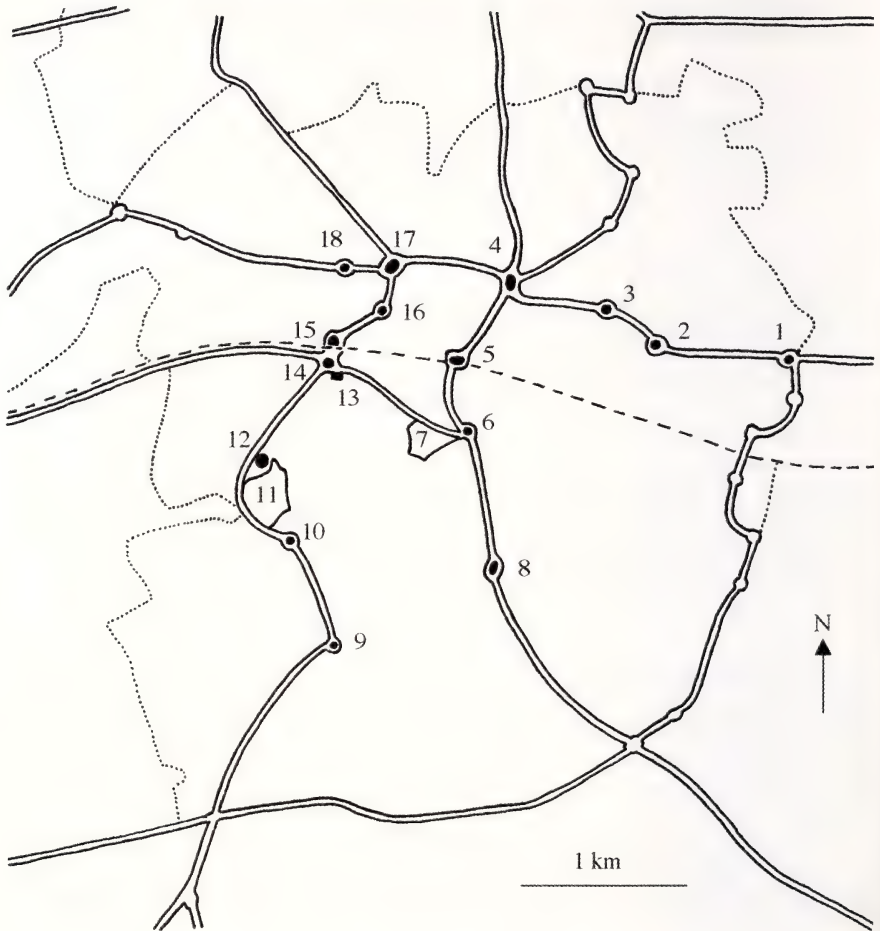


Figure 1. Map of Bracknell showing the position of the 18 sample sites. Roads are shown with solid lines, the dashed line is a railway, and the dotted lines indicate the outer edge of the urban area. To the north and west of the town the land use is principally agricultural, while to the south and east there are large areas of forestry. Sample sites: 1, Baldocks roundabout; 2, Running Horse roundabout; 3, Eastern Road roundabout; 4, Meteorological Office roundabout; 5, Bracknell Station roundabout; 6, Broad Lane roundabout; 7, Bill Hill; 8, Bracknell Sports Centre roundabout; 9, Hanworth roundabout; 10, Mill Pond roundabout; 11, Mill Pond Park; 12, Mill Lane slip road; 13, Downshire Way; 14, Twin Bridges roundabout south; 15, Twin Bridges roundabout north; 16, The Point roundabout; 17, 3M roundabout; 18, Arlington roundabout.

Coddington, 1994; Magurran, 2004). Evaluation of the various estimators, using a variety of taxa, has been equivocal, with different estimators being judged the most useful in different contexts (Colwell & Coddington, 1994; Condit *et al.*, 1996; Walther & Morand, 1998; Longino *et al.*, 2002; Foggo *et al.*, 2003).

In this study the species-richness of Hemiptera (Auchenorrhyncha, Heteroptera, Psylloidea) of roundabouts within the town of Bracknell, England was estimated using four non-parametric species-richness estimators, Chao 1; Chao 2, Jack-knife 1; and Jack-knife 2. Hemiptera were chosen as a diverse, abundant and easy to collect group of insects (Morris, 1971; Duelli, *et al.*, 1999; Fauvel, 1999), which has been relatively little studied in urban areas (McIntyre, 2000). The Chao 1 estimator was chosen given its overall good performance (Foggo *et al.*, 2003), and Chao 2 and Jack-knife 1 and 2 have been found to be particularly useful when sampling is limited (Colwell & Coddington, 1994; Walther & Morand, 1998). Given the time constraints of the study it was not possible to gain a complete enough inventory of species to accurately assess the performance of estimators directly, but it was possible to gain some measure of their relative merit by comparing the estimates from overall and habitat based samples, and to use the estimates to generate species-area relationships for comparison with those previously described for the same study system by Helden & Leather (2004).

METHODS

Bracknell is a town located in southeast England between latitude 51°23' and 51°26' N, and longitude 0°43' and 0°47' W. It is part of the unitary authority of Bracknell Forest, which also includes several other smaller settlements, as well as considerable areas of farmland, heathland and forest. Although a settlement did exist earlier, it was the New Towns Act of 1946 that led to the great expansion of the town to its present population of approximately 52 000. Despite the urbanisation and population growth, the development of the town of Bracknell has been managed in such a way as to preserve several large parkland areas and numerous smaller open areas, and it has also retained a very large number of trees.

Table 1. Details of the names and locations of the sample sites.

Site number and name	Grid reference	Area (m ²)
1 Baldocks roundabout	SU891689	401
2 Running Horse roundabout	SU883691	1962
3 Eastern Road roundabout	SU880693	1800
4 Meteorological Office roundabout	SU874695	6275
5 Bracknell Station roundabout	SU871689	5198
6 Broad Lane roundabout	SU871685	4132
7 Bill Hill	SU869684	43 574
8 Bracknell Sports Centre roundabout	SU873677	3866
9 Hanworth roundabout	SU863671	2165
10 Mill Pond roundabout	SU860678	2050
11 Mill Pond Park	SU859681	63 681
12 Mill Lane slip road	SU858683	7118
13 Downshire Way	SU863688	4340
14 Twin Bridges roundabout south	SU863690	3268
15 Twin Bridges roundabout north	SU863691	2144
16 The Point roundabout	SU867693	489
17 3M roundabout	SU867695	5016



Figure 2. Mill Pond roundabout (site 10) was typical of many roundabouts, with no pedestrian access.



Figure 3. Twin Bridges roundabout south (site 14) was representative of several roundabouts which were sunk below the level of the road and dissected by one or more pedestrian/cycle paths accessed via subways.

The study sites were 18 more or less road-enclosed areas, 14 of which were roundabouts (Fig. 1). These sites were selected as part of a study of species-area relationships (Helden & Leather, 2004). The four non-roundabout sites were: Bill Hill (7), an area of woodland and parkland enclosing an ancient monument; Mill Pond Park (11), which is a park containing a mixture of grassland and woodland surrounding a large lake; Mill Lane slip road (12), which is an area of grassland interspersed with mature willow trees (*Salix*), and which is very like a roundabout as it is completely surrounded by a major road and a curved slip road; and Downshire Way (13), a small patch of unused land that has been widely planted with trees but contains quite a large area of completely unmanaged grassland. Further details of the sites are shown in Table 1. Two typical roundabout sites are illustrated in Figures 2 and 3.

Grassland Hemiptera were sampled between 15 and 17 July 2002, using a Vortis Insect Suction Sampler (Burkard Manufacturing Co Ltd, Rickmansworth, Herts, UK) (Arnold, 1994). A five second sample was taken at ten randomly chosen points on each of either four or eight transects per site, and the total catch from a single transect was retained as one overall sample. The number of transects was dependent on the number of management regimes present, with four transects per regime.

Prior to sampling arboreal Hemiptera, the location and species of all trees at the 18 sites, that could be sampled and were not enclosed within larger blocks of woodland, were recorded. Then at each site between one and four trees of each species were sampled by vigorously beating part of each tree for five seconds above a sweep net (45 × 60 cm) and then collecting all the adult Hemiptera from the net with a pooter. All arboreal Hemiptera sampling was done between 13 and 20 July 2002.

In addition to the systematic sampling of grassland and arboreal Hemiptera in the summer of 2002, a number of additional species were recorded on a more casual basis between 1996 and 2002. Samples were collected at various times of the year and from a range of terrestrial habitats including from bushes and various ruderal plants that were not sampled during the main study.

Insects were identified using Leston & Scudder (1956), Southwood & Leston (1959), Wagner & Weber (1964), Le Quesne (1960, 1965, 1969), Le Quesne & Payne (1981), Hodkinson & White (1979), Ossiannilsson (1981), Miller (2001) and Nau (2002b), and are listed according to Hodkinson & White (1979), Le Quesne & Payne (1981) and Nau (2002a).

Maximum species estimates were made by calculating the Chao 1, Chao 2, Jack-knife 1 and Jack-knife 2 species richness estimators, using EstimateS version 6.0b1 (Colwell, 2001). Overall Bracknell roundabout species-richness was estimated for each of the three Hemiptera groups using all the replicated samples from all sites and habitats. Similar estimates were also made for the two principal habitat types, grassland and arboreal, using all the samples from all sites from each habitat.

To enable comparison with the previously published species-area relationship of arboreal Hemiptera at these sites (Helden & Leather, 2004), maximum species-richness estimates were made for arboreal Hemiptera only, using samples within each site as replicates. In this case the three Hemiptera groups were combined in each sample. Regressions between species-richness estimates and log (ln) area and the log (ln) number of tree species were carried out using the R statistical package (version 1.7.1) (Ihaka & Gentleman, 1996). The area and tree species data were taken from Helden & Leather (2004).

An estimate was made of the relative area of land, within the town of Bracknell, under the following categories of land use: buildings, railways, gardens, open space,

Table 2. Species of Hemiptera recorded on urban Bracknell roundabouts and related sites

Species identity	Number of individuals	Number of sites
Suborder Sternorrhyncha		
Superfamily Psylloidea		
Family Aphalaridae		
<i>Rhinocola aceris</i> (L.)	10	4
Family Psyllidae		
<i>Cacopsylla fulguralis</i> (Kuwayama)	11	5
<i>Psylla alni</i> (L.)	6	1
<i>Psylla brunneipennis</i> Edwards	5	4
<i>Psylla foersteri</i> Flor	9	1
<i>Psylla hartigi</i> Flor	14	6
<i>Psylla mali</i> Schmidberger	83	4
<i>Psylla melanoneura</i> Förster	42	11
<i>Psylla peregrina</i> Förster	133	9
<i>Psylla pulchra</i> (Zetterstedt)	2	1
<i>Psylla sorbi</i> (L.)	155	6
<i>Psyllopsis discrepans</i> (Flor)	4	1
<i>Psyllopsis fraxini</i> (L.)	12	3
<i>Psyllopsis fraxinicola</i> (Förster)	95	6
<i>Psylla</i> sp.	1	1
<i>Psyllopsis</i> sp.	9	2
Family Triozidae		
<i>Trioza rhamni</i> (Schränk)	1	1
<i>Trioza urticae</i> (L.)	23	7
Suborder Auchenorrhyncha		
Family Cercopidae		
<i>Aphrophora alni</i> (Fallén)	1	1
<i>Neophilaenus lineatus</i> (L.)	9	5
<i>Philanenus spumarius</i> (L.)	6	4
Family Cicadellidae		
Subfamily Megophthalminae		
<i>Megophthalmus scanicus</i> (Fallén)	9	3
Subfamily Idiocerinae		
<i>Idiocerus albicans</i> Kirschbaum	2	1
<i>Idiocerus confusus</i> Flor	1	1
<i>Idiocerus populi</i> (L.)	1	1
Subfamily Macropsinae		
<i>Macropsis infuscata</i> (J. Sahlberg)	2	1
<i>Oncopsis carpini</i> (J. Sahlberg)	6	3
<i>Oncopsis avellanae</i> Edwards	1	1
<i>Oncopsis subangulata</i> (J. Sahlberg)	10	6
<i>Oncopsis tristis</i> (Zetterstedt)	3	1
<i>Pediopsis tiliae</i> (Germar)	1	1
Subfamily Agalliinae		
<i>Agallia ribauti</i> Ossiannilsson	7	3
Subfamily Aphrodinae		
<i>Aphrodes albifrons</i> (L.)	17	4
<i>Aphrodes bicinctus</i> (makarovi) (Schränk)	11	3
<i>Aphrodes flavostriatus</i> (Donovan)	1	1
<i>Aphrodes serratulae</i> (Fabricius)	71	12
Subfamily Deltocephalinae		
<i>Arthaldeus pascuellus</i> (Fallén)	28	8
<i>Athysanus argentarius</i> Metcalf	2	1

Table 2. (continued)

Species identity	Number of individuals	Number of sites
<i>Balclutha punctata</i> (Fabricius)	2	1
<i>Deltocephalus pulicaris</i> (Fallén)	34	8
<i>Euscelis incisus</i> (Kirschbaum)	34	7
<i>Psammotettix confinis</i> (Dahlbom)	1	1
<i>Streptanus marginatus</i> (Kirschbaum)	3	3
<i>Streptanus sordidus</i> (Zetterstedt)	8	3
<i>Macrosteles</i> sp.	2	1
<i>Psammotettix</i> sp.	2	1
Subfamily Typhlocybinae		
<i>Alebra albostriella</i> (Fallén)	31	4
<i>Alebra wahlbergi</i> (Boheman)	43	4
<i>Ahnetoidea alneti</i> (Dahlbom)	135	6
<i>Arboridia ribauti</i> (Ossiannilsson)	2	2
<i>Dikraneura variata</i> Hardy	7	2
<i>Edwardsiana crataegi</i> (Douglas)	26	6
<i>Edwardsiana frustrator</i> (Edwards)	1	1
<i>Edwardsiana hippocastani</i> (Edwards)	1	1
<i>Edwardsiana prunicola</i> (Edwards)	3	2
<i>Edwardsiana rosae</i> (L.)	1	1
<i>Edwardsiana salicicola</i> (Edwards)	1	1
<i>Edwardsiana spinigera</i> (Edwards)	1	1
<i>Empoasca decipiens</i> Paoli	1	1
<i>Empoasca vitis</i> (Göthe)	4	3
<i>Eupteryx notata</i> Curtis	3	2
<i>Eupteryx urticae</i> (Fabricius)	2	2
<i>Eurhadina loewii</i> (Then)	1	1
<i>Eurhadina pulchella</i> (Fallén)	7	2
<i>Fagocyba cruenta</i> (Herrich-Schaeffer)	38	13
<i>Kyboasca bipunctata</i> (Oshanin)	8	1
<i>Kybos betulicola</i> (Wagner)	3	1
<i>Kybos populi</i> (Edwards)	1	1
<i>Kybos strigilifer</i> (Ossiannilsson)	2	1
<i>Lindbergina aurovittata</i> (Douglas)	1	1
<i>Ossiannilssonola callosa</i> (Then)	2	2
<i>Ribautiana debilis</i> (Douglas)	10	4
<i>Ribautiana scalaris</i> (Ribaut)	7	2
<i>Ribautiana tenerrima</i> (Herrich-Schaeffer)	8	4
<i>Ribautiana ulmi</i> (L.)	12	1
<i>Typhlocyba bifasciata</i> Boheman	1	1
<i>Typhlocyba quercus</i> (Fabricius)	3	2
<i>Zygina flammigera</i> (Geoffroy in Fourcroy)	1	1
<i>Zyginidia scutellaris</i> (Herrich-Schaeffer)	41	6
<i>Edwardsiana</i> sp.	11	6
<i>Kybos</i> sp. (<i>virgator</i> / <i>strigilifer</i> / <i>calyculus</i>)	1	1
<i>Kybos</i> sp. (<i>rufescens</i> / <i>butleri</i>)	1	1
<i>Kybos</i> sp. (<i>smargdula</i> / <i>betulicola</i>)	2	1
<i>Zygina (angusta)</i> / <i>ordinaria</i>)	4	1
Family Delphacidae		
<i>Dicranotropis humata</i> (Boheman)	1	1
<i>Javesella pellucida</i> (Fabricius)	5	5
<i>Javesella dubia</i> (Kirschbaum)	1	1
<i>Kosswigianella exigua</i> (Boheman)	2	2

Table 2. (continued)

Species identity	Number of individuals	Number of sites
<i>Struebingianella dalei</i> (Scott)	21	2
<i>Xanthodelphax stramineus</i> (Stål)	2	1
<i>Javesella</i> sp.	7	7
<i>Muellerianella</i> sp.	4	2
Suborder Heteroptera		
Family Tingidae		
<i>Physatocheila dumentorum</i> (Herrich-Schäffer)	6	2
Family Microphysidae		
<i>Loricula elegantula</i> (Bärensprung)	1	1
Family Miridae		
<i>Amblytylus nasutus</i> (Kirschbaum)	1	1
<i>Atractotomus mali</i> (Meyer-Dür)	6	2
<i>Campyloneura virgula</i> (Herrich-Schäffer)	5	3
<i>Capsus ater</i> (L.)	1	1
<i>Chlamydatus saltitans</i> (Fallén)	7	4
<i>Deraecoris flavilinea</i> (A. Costa)	24	8
<i>Lygocoris contaminatus</i> (Fallén)	12	6
<i>Lygocoris populi</i> Leston	7	2
<i>Lygocoris rugicollis</i> (Fallén)	18	1
<i>Lygus rugulipennis</i> Poppius	1	1
<i>Magaloceroea recticornis</i> (Geoffroy)	2	1
<i>Notostira elongata</i> (Geoffroy)	11	4
<i>Orthocephalus saltator</i> (Hahn)	2	1
<i>Pithanus maerkelii</i> (Herrich-Schäffer)	14	3
<i>Phoenicocoris obscurellus</i> (Fallén)	14	2
<i>Phylus coryli</i> (L.)	14	4
<i>Phylus pallipes</i> Fieber	1	1
<i>Phylus melanocephalus</i> (L.)	2	2
<i>Pinalitus cervinus</i> (Herrich-Schäffer)	6	2
<i>Plagiognathus arbustorum</i> (Fabricius)	4	1
<i>Plagiognathus chrysanthemi</i> (Wolff)	8	3
<i>Psallus assimilis</i> Stichel	1	1
<i>Psallus betuleti</i> (Fallén)	3	3
<i>Psallus confusus</i> Rieger	4	1
<i>Psallus flavellus</i> Stichel	3	2
<i>Psallus lepidus</i> (Fieber)	9	5
<i>Psallus mollis</i> (Mulsant & Ray)	1	1
<i>Psallus varians</i> (Herrich-Schäffer)	10	4
<i>Orthotylus flavinervis</i> (Kirschbaum)	2	1
<i>Orthotylus marginalis</i> Reuter	12	2
<i>Orthotylus tenellus</i> (Fallén)	2	2
<i>Orthotylus viridinervis</i> (Kirschbaum)	3	2
<i>Stenodema calcarata</i> (Fallén)	1	1
<i>Sthenarus rotermundi</i> (Scholtz)	10	2
<i>Psallus</i> sp. (<i>confusus</i> / <i>mollis</i>)	5	2
Family Nabidae		
<i>Himacerus mirmicoides</i> (O. Costa)	2	1
Family Anthocoridae		
<i>Anthocoris confusus</i> Reuter	2	2
<i>Anthocoris nemorum</i> (L.)	10	5
<i>Anthocoris nemoralis</i> (Fabricius)	2	2
<i>Cardiastethus fasciiventris</i> (Garbiglietti)	3	3

Table 2. (continued)

Species identity	Number of individuals	Number of sites
<i>Tetraphleps biscuspis</i> (Herrich-Schäffer)	1	1
<i>Orius</i> sp.	1	1
Family Berytidae		
<i>Berytinus</i> sp. nymph	4	2
Family Lygaeidae		
<i>Kleidocerys resedae</i> (Panzer)	103	5
<i>Megalonotus chiragra</i> (Fabricius)	1	1
<i>Orsillus depressus</i> Dallas	2	1
<i>Scolopostethus affinis</i> (Schilling)	1	1
Family Coreidae		
<i>Coriomerus denticulatus</i> (Scopoli)	1	1
<i>Gonocerus acuteangulatus</i> (Goeze)	1	1
Family Pentatomidae		
<i>Palomena prasina</i> (L.)	2	2
<i>Podops inuncia</i> (Fabricius)	1	1
Family Acanthosomatidae		
<i>Acanthosoma haemorrhoidale</i> (L.)	3	1
<i>Elasmostethus tristriatus</i> (Fabricius)	1	1
<i>Elasmucha grisea</i> (L.)	2	2

woodland and open water. Using a 1:25 000 scale map (Ordnance Survey, Explorer Series, map number 160), the land use was recorded every 1 mm on the map for 4 cm, equivalent to 1 km, along north, east, south, west transects from each of the 18 sites.

RESULTS

The species and number of individuals of Hemiptera recorded are shown in Table 2. Only four species were collected during both tree and grassland sampling: *Philaenus spumarius* (L.), *Balclutha punctata* (F.), *Alebra wahlbergi* (Boheman) and *Psallus betuleti* (Fallén). In total 1336 individuals of 96 species were recorded from trees, and 635 individuals of 46 species were found in grassland. Of these, 67 species were Auchenorrhyncha, 55 were Heteroptera and 16 were Psylloidea. A further 49 species have either been found during previous unsystematic field collecting, or were recorded at the field sites but not during the sampling procedure, and these are shown in Table 3. Addition of the these further species increases the known Bracknell species richness totals to 81 Auchenorrhyncha, 89 Heteroptera and 17 Psylloidea.

Species richness estimates are given in Table 4. Observed species-richness values given in Table 4 are slightly different from those given above, because those in the table are from the EstimateS analyses which included a number of species which could be identified as being one of two or more species, both or all of which were not found elsewhere, but could not be specifically named with certainty. For example this occurred in the case of the four female specimens of *Muellerianella* planthoppers (*M. brevipennis* (Boheman) or *M. fairmairei* (Perris)), as these are distinguishable from other female delphacids but only the males of these species can be identified specifically (Booij, 1981).

Table 4 also shows species-richness estimate values, standard deviation and 95% confidence limits. Auchenorrhyncha estimates varied from 91–111 species, while for Heteroptera and Psylloidea the range was between 67–86 and 16–25, respectively.

Table 3. Species of Hemiptera found during unsystematic sampling in Bracknell at different locations and at times outside the sampling period, between 1996–2002

Suborder Auchenorrhyncha	Miridae
Cicadellidae	<i>Blepharidopterus angulatus</i> (Fallén)
<i>Adarrus ocellaris</i> (Fallén)	<i>Calocoris striatellus</i> (Fabricius)
<i>Aguriahana stellulata</i> (Burmeister)	<i>Cyllocoris histrionius</i> (L.)
<i>Eupterycyba jucunda</i> (Herrich-Schaeffer)	<i>Deraeocoris lutescens</i> (Schilling)
<i>Eupteryx aurata</i> (L.)	<i>Deraeocoris ruber</i> (L.)
<i>Graphocephala fennahi</i> Young	<i>Dicyphus epilobii</i> Reuter
<i>Graphocraerus ventralis</i> (Fallén)	<i>Dicyphus pallicornis</i> (Fieber)
<i>Grypotes puncticollis</i> (Herrich-Schaeffer)	<i>Dryophilocoris flavoquadrinaculatus</i> (DeGeer)
<i>Hauptidia maroccana</i> (Melichar)	<i>Harpocera thoracica</i> (Fallén)
<i>Iassus lanio</i> (L.)	<i>Heterocordylus tibialis</i> (Hahn)
<i>Macrosteles viridigriseus</i> (Edwards)	<i>Heterotoma planicornis</i> (Pallas)
	<i>Liocoris tripustulatus</i> (Fabricius)
Delphacidae	<i>Malacocoris chlorizans</i> (Panzer)
<i>Conomelus anceps</i> (Germar)	<i>Miris striatus</i> (L.)
<i>Ditropis pteridis</i> (Spinola)	<i>Monalocoris filicis</i> (L.)
	<i>Orthops campestris</i> (L.)
Issidae	<i>Phytocoris tiliae</i> (Fabricius)
<i>Issus coleoptratus</i> (Fabricius)	<i>Psallus ambiguus</i> (Fallén)
	<i>Psallus perrisi</i> (Mulsant & Rey)
Cixiidae	<i>Stenodema laevigata</i> (L.)
<i>Tachycixius pilosus</i> (Olivier)	
Suborder Heteroptera	Pentatomidae
Acanthosomatidae	<i>Aelia acuminata</i> (L.)
<i>Elasmostethus interstinctus</i> (L.)	<i>Dolycoris baccarum</i> (L.)
	<i>Eurydema oleracea</i> (L.)
Aradidae	<i>Eysarcoris fabricii</i> (Kirkaldy)
<i>Aradus depressus</i> (Fabricius)	<i>Palomena prasina</i> (L.)
	<i>Pentatoma rufipes</i> (L.)
Coreidae	<i>Piezodorus lituratus</i> (Fabricius)
<i>Coreus marginatus</i> (L.)	
Cydnidae	Rhopalidae
<i>Legnotus limbosus</i> (Geoffroy)	<i>Rhopalus subrufus</i> (Gmelin)
Lygaeidae	Suborder Sternorrhyncha
<i>Heterogaster urticae</i> (Fabricius)	Superfamily Psylloidea
<i>Stygnocoris rusticus</i> (Fallén)	Psyllidae
	<i>Arytainilla spartiophila</i> (Förster)

The mean value of the four estimators is also given. For Heteroptera and Psylloidea the Jack-knife 1 estimates were closest to the mean value, while for Auchenorrhyncha it was Chao 2, closely followed by Jack-knife 1. The standard deviation was consistently lower for Jack-knife 1 than for the other estimators, with the exception of Chao 1 for Psylloidea. No standard deviation is given for Chao 2, as this is not calculated by EstimateS version 6.0b1.

Species richness estimates for Auchenorrhyncha and Heteroptera from the two principal habitat types, grassland and arboreal, are shown in Table 5. Table 6 shows the comparison between the species richness estimates using all samples, and by combining the estimates from grassland and arboreal samples. For Auchenorrhyncha

Table 4. Observed and estimated species-richness of Hemiptera on Bracknell roundabouts, using all samples

Estimator	Auchenorrhyncha	Heteroptera	Psylloidea
Chao 1	91.0	66.7	16.3
Standard deviation	12.8	7.6	1.3
95% confidence interval	25.0	14.9	2.6
Chao 2	97.0	75.1	24.3
Standard deviation	14.3	11.8	17.1
95% confidence interval	28.1	23.2	33.6
Jack-knife 1	96.8	75.8	21.0
Standard deviation	4.7	4.7	2.2
95% confidence interval	9.3	9.3	4.3
Jack-knife 2	110.7	85.8	24.9
Standard deviation	—	—	—
95% confidence interval	—	—	—
Observed species richness	70	56	16
Mean of estimators	98.9	75.8	21.6
Difference between observed and Jack-knife 1	26.8	19.8	5.0
Difference as % of estimated (Jack-knife 1)	27.7	26.2	23.7

Table 5. Observed and estimated Hemiptera species-richness from grassland and arboreal habitats on Bracknell roundabouts

Estimator	Auchenorrhyncha		Heteroptera	
	Grassland	Arboreal	Grassland	Arboreal
Chao 1	35.0	61.1	23.0	39.6
Standard deviation	8.3	12.2	4.8	2.8
95% confidence interval	16.2	24.0	9.4	5.5
Chao 2	37.0	69.9	30.6	41.3
Standard deviation	9.0	16.4	12.5	4.0
95% confidence interval	17.7	32.0	24.4	7.8
Jack-knife 1	36.8	64.8	27.7	45.9
Standard deviation	2.7	4.1	2.9	3.5
95% confidence interval	5.3	8.0	5.7	6.8
Jack-knife 2	41.7	77.6	33.5	46.0
Standard deviation	—	—	—	—
95% confidence interval	—	—	—	—
Observed species richness	28	44	19	37
Difference between observed and Jack-knife 1	8.8	20.8	8.7	8.9
Difference as % of estimated (Jack-knife 1)	24.0	32.1	31.5	19.4

the sum of the habitat based estimates were consistently higher than estimates based on all arboreal samples, whereas for the Heteroptera they were lower. For both groups the Jack-knife 1 estimates showed the closest agreement.

Table 7 shows the results of regressions between log (ln) species-richness estimate values, based on all samples, and both log (ln) area and log (ln) tree species richness at the 18 sites. All regressions were significant. The area regression (species-area

Table 6. Comparison of species-richness estimates using all samples and from using the sum of habitat-based estimates

Estimator	Auchenorrhyncha	Heteroptera
Chao 1		
All samples	91	66.71
Grassland + arboreal samples	96.07	62.58
Difference	-5.07	4.13
Chao 2		
All samples	97	75.05
Grassland + arboreal samples	106.94	71.83
Difference	-9.94	3.22
Jack-knife 1		
All samples	96.83	75.83
Grassland + arboreal samples	101.64	73.64
Difference	-4.81	2.19
Jack-knife 2		
All samples	110.74	85.75
Grassland + arboreal samples	119.35	79.47
Difference	-8.61	6.28

Table 7. Regressions between log (ln) arboreal Hemiptera species-richness estimates and both log (ln) roundabout area and log (ln) number of tree species at each roundabout

Comparison	Estimator	t	p	r ²	d.f.
Area	Chao 1	2.52	p<0.05	0.30	1,15
	Chao 2	2.47	p<0.05	0.29	1,15
	Jack-knife 1	2.99	p<0.01	0.37	1,15
	Jack-knife 2	2.85	p<0.05	0.35	1,15
Tree species richness	Chao 1	8.52	p<0.001	0.83	1,15
	Chao 2	8.17	p<0.001	0.82	1,15
	Jack-knife 1	10.25	p<0.001	0.88	1,15
	Jack-knife 2	10.33	p<0.001	0.88	1,15

Table 8. Mean (\pm SE) land use found within 1 km of the 18 sample sites

Land use type	Mean	% area
Water	0.6	(0.4)
Strongly man affected habitats		
Road/railway	26.7	(1.6)
Building	18.6	(1.6)
Total	45.3	(2.5)
Semi-natural terrestrial habitats		
Other open area	34.0	(1.9)
Garden	14.4	(1.3)
Woodland	5.7	(2.0)
Total	54.2	(2.4)

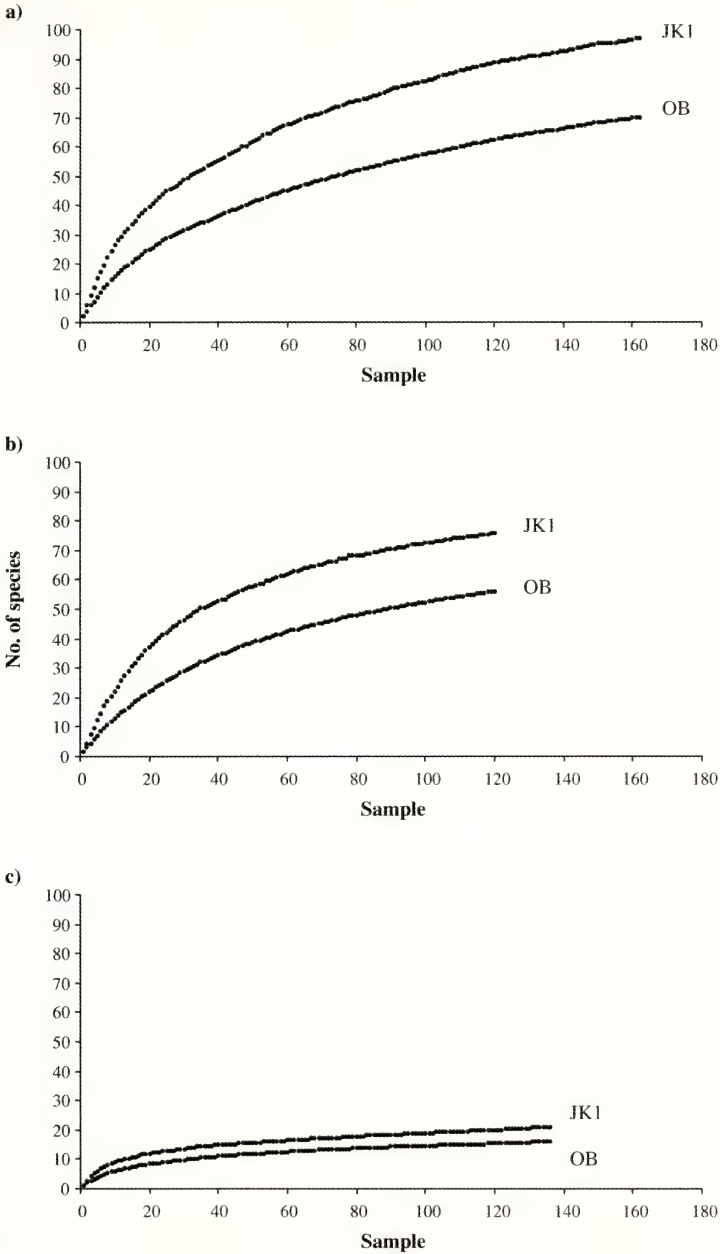


Figure 4. Observed (OB) and Jack-knife 1 species richness estimates (JK1) for the number of species of (a) Auchenorrhyncha, (b) Heteroptera and (c) Psylloidea found within Bracknell roundabouts. Estimates were calculated using all samples, both grassland and arboreal, from all sites.

relationship) with the highest t and r^2 values was that using Jack-knife 1 estimates, while for tree species richness Jack-knife 2 had the highest t and r^2 values, but these were only very slightly higher than those for Jack-knife 1.

Comparison of the four species-richness estimators in terms of overall mean estimates and their standard errors, differences between habitat-based and all sample estimates, and regressions indicated that overall the Jack-knife 1 estimator gave the best species-richness estimates for Bracknell Hemiptera. Figure 4 shows the observed and Jack-knife 1 estimated species-richness for the three Hemiptera groups. For the Auchenorrhyncha and Heteroptera both observed and estimated species-richness clearly have not reached an asymptote with the number of samples taken, indicating that further sampling would result in higher estimates (Coddington *et al.*, 1996). In contrast the estimate for the Psylloidea rises only very slowly with sample number, indicating that it is much closer to an asymptote.

Table 4 shows the difference between the observed and estimated Jack-knife 1 species richness for each Hemipteran group. These figures indicated that 27 Auchenorrhyncha, 20 Heteroptera and 5 Psylloidea species were unsampled, which would approximate to 28%, 26% and 24%, respectively, of the estimated species richness. A similar approach using habitat specific data (Table 5) indicated that the most under-sampled category was arboreal Auchenorrhyncha, with 21 species representing 32% of the estimated species-richness, remaining unsampled. A very similar proportion of the grassland Heteroptera may be unsampled but in this numerically smaller group this equated to only 9 further species. The arboreal Heteroptera appeared to be the least incompletely sampled with a further 9 species likely, equating to 19% of the estimate.

Mean percentage land use categories are shown in Table 8. Grassland, gardens and woodland together made up an average of approximately 54% of Bracknell land use, with buildings and transport infrastructure contributing around 45%.

DISCUSSION

Notable species

Several notable species were recorded in the study, and some of these were species that have recently colonised the UK. The most recent colonist was the psyllid *Cacopsylla fulguralis* (Kuwayama), a pest of *Elaeagnus* spp., which is native to eastern Asian countries such as China, Korea and the Philippines, and was first found in the UK in 2000, having been first recorded in Europe a year earlier. By 2002 it had been recorded at a number of widely spaced locations within Britain, including Surrey, the county which borders Bracknell Forest to the south (Malumphy *et al.*, 2002; Malumphy & Halstead, 2003). In our study, eleven individuals were found at five of the sites and on five different tree species, although not on *Elaeagnus*, indicating that it may be quite widespread in the area.

Twenty-four individuals of the mirid *Deraeocoris flavilinea* (A. Costa) were recorded from eleven different species of tree at eight of the sample sites. This species was first recorded in the UK in 1996, but has subsequently been found quite frequently, having become rapidly established within this country (Jones, 1999; Miller, 2001; Nau & Brooke, 2003). Another relatively newly established species was *Orsillus depressus* Dallas (Heteroptera: Lygaeidae), which was first recorded in the UK in 1989, and which has subsequently been found in a number of sites scattered over South-East England (Hawkins, 1989; B.S. Nau, *pers. comm.*).

Gonocerus acuteargulus (Goeze) (Heteroptera: Coreidae) has been known to be present in the UK for many years but until relatively recently was restricted to Box Hill in Surrey and has been listed as endangered (Southwood & Leston, 1959; Kirby, 1992). This species has however, shown a recent range increase, is now described as common in Surrey and has also been recorded in Kent, Middlesex and Sussex (Hawkins, 2003). It is possible that the specimen found in Bracknell is the first record of this species in Berkshire. The two most notable leafhopper species to be recorded were, *Athysanus argentarius* Metcalf and *Pediopsis tiliae* (Germar) (Auchenorrhyncha: Cicadellidae). *Athysanus argentarius* is a grassland species, which was first found in Britain in 1866, then not again until 1951. Since the 1950s until fairly recently, it was largely only recorded from coastal areas, but has now also been found in a number of inland sites having also shown an apparent range increase (Badmin, 1981; Stewart, 1987; Verdcourt, 1994; Salmon & Chapman, 2000). *Pediopsis tiliae* is an uncommon species, which feeds on lime (*Tilia* sp.), particularly Small-leaved lime (*Tilia cordata*). Interestingly in the context of the present study many records of this species come from urban or other semi-natural areas (Badmin, 1991, 1994).

Species richness

Of the four non-parametric species-richness estimators used, Jack-knife 1 appeared to be the best for Bracknell Hemiptera. Generally Jack-knife 1 showed the closest values to the means of the four estimators, showed the smallest differences between estimates made using all samples and those calculated from the sum of estimates from grassland and arboreal habitats, the smallest standard deviations, and the best regressions with area and tree species-richness (Tables 4, 5, 6 & 7). Consequently Jack-knife 1 estimates were used to compare with observed species-richness.

The Hemiptera species richness in Bracknell was considerable, with the 18 study sites yielding 67 Auchenorrhyncha, 55 Heteroptera and 16 Psylloidea species (Table 2), which represented approximately 18%, 12% and 20% of the respective UK species totals for these three groups of Hemiptera (the national total of Heteroptera used excluded the aquatic and semi-aquatic species, which were not sampled in the study). These figures were the result of a single set of samples taken over a very short space of time, and hence the true species richness is likely to be somewhat higher. This is illustrated by the further 49 species that were recorded in Bracknell but outside the main study during the period 1996–2002 (Table 3). With these further species the totals rise to 81 Auchenorrhyncha, 89 Heteroptera and 17 Psylloidea, which equate to approximately 22%, 19% and 22% of the respective national totals.

Calculations of the Jack-knife 1 estimator gave species-richness figures of 97 Auchenorrhyncha, 76 Heteroptera and 21 Psylloidea, which would equate to 26%, 13% and 27% of the respective national totals. The results also indicate that the estimates had not reached an asymptote relative to the number of samples (Fig. 4), which indicates that further sampling would result in higher estimates (Coddington *et al.*, 1996). Thus our data, both in terms of actual species recorded and estimated species-richness, indicates that at least 20% of the UK Hemiptera species can be found within the town of Bracknell.

The species richness of Auchenorrhyncha found was comparable with that found during six years of suction sampling at Silwood Park, which is located 10 km to the east of Bracknell (Waloff, 1973). At Silwood Park 115 species were recorded, but this was over six complete years, and when just July catches were included this figure was

reduced to 67, which is exactly the same number of species recorded at the 18 study sites. Thus even though Bracknell is considerably more urbanised, the rather limited sampling of the present study indicated a comparable species richness to that of Silwood Park.

The difference between observed and estimated species-richness gives a measure of the number of species that occur in the sampled area but remain unrecorded. There remains some uncertainty about the number of such species unless the estimate has reached an asymptote at the level of the true species-richness (Foggo *et al.*, 2003), and consequently comparison of observed and estimated values will under-estimate the number of un-recorded species. Although the reported estimates had not reached an asymptote (Fig. 4), the difference between estimated and observed species-richness can still be useful, particularly in comparative terms, in giving at least some idea, all be it an under-estimate, of the number of un-sampled species. In this study it was estimated that 27 Auchenorrhyncha, 20 Heteroptera and 5 Psylloidea were un-recorded, which would represent 28%, 26% and 24% of the estimated totals (Table 4). Thus in all three Hemiptera groups approximately a quarter of estimated species remained un-recorded. When different habitat types were considered separately, the data indicated that arboreal Heteroptera were the most completely sampled (19% un-recorded), followed by Psylloidea and grassland Auchenorrhyncha (24%), then grassland Heteroptera and arboreal Auchenorrhyncha (32%).

The number of species found in this study and the related species richness estimates were limited by temporal, spatial and habitat related constraints. The timing of sampling is one of the most important of these. For the arboreal part of the study all the samples were taken within a nine day period in mid June, while the grasslands were sampled over three days in mid July. Given that the phenology of insect species differs, the limited sampling carried out would have meant that many species would either not have been found or would have been in the larval stages, and therefore in most cases unidentifiable. This would have been particularly the case for the grassland Auchenorrhyncha, for which adult species richness and abundance reach a peak during the late summer months of August and September (Andrzejewska, 1965; Morris, 1971, 1973; Waloff & Solomon, 1973; Morris & Lakhani, 1979; Morris, 1981a; Lawton, 1983; Sedlacek *et al.*, 1988; Morris, 1990b), and this problem is reflected in that large numbers of immature individuals were caught in the grassland samples. A further factor limiting the estimate of species richness is that the study was limited in terms of the location of sampling. At Bill Hill (7) and Mill Pond Park (11) only the trees at the edges of the areas of woodland were investigated, while at all sites sampling was restricted to trees and grassland, but many species are associated with other habitats such as bushes and herbaceous plants such as nettles (Davis, 1991).

Using Bracknell as an example of an urban area clearly shows that high species richness can be maintained within towns and cities. One of the most important factors in maintaining urban biodiversity is the proportion of open space. Davis (1978) found that species richness correlated positively with the percentage of open space within a one kilometre radius of sample sites. In this study it was found that Bracknell had approximately 54% 'open space' (Table 8), which although relatively low compared with some of the suburbs studied by Davis (1978), still indicated that approximately half of the land area was made up of grassland, woodland, verges, 'waste ground' and gardens. The fragmentation of such habitats in urban areas has a strong influence on species richness through its effect on population sizes, isolation, and the processes of colonization and extinction. The effects of fragmentation vary between different species according to their habitat specialization, trophic level,

population dynamics, rarity and dispersal ability (Davis & Glick, 1978; Steffan-Dewenter & Tscharntke, 2002). Andrén (1994, 1999), reported that relatively low levels of habitat loss and fragmentation resulted in little loss of species but when the proportion of habitat remaining fell below 20 to 30% there would be an exponential loss of species. Woodland habitat in Bracknell is very fragmented and only about 6% remains within the town (Table 8). Although areas of woodland are rare, the town does have a very large number of trees of many species, both planted and those retained during development, which provide a semi-continuous habitat throughout much of the urban area. These trees maintain the habitat connectivity that is so important in maintaining biodiversity (Andrén, 1994, 1999; Gonzalez *et al.*, 1998; Fernández-Juricic, 2000; Savard, *et al.*, 2000; Steffan-Dewenter & Tscharntke, 2002; Rudd *et al.*, 2002). Connectivity in grassland habitats is to some extent maintained by gardens, parks and other open areas and by road verges, but these areas are very variable in their quality because of the differing level of management, which has a very strong effect of grassland Hemiptera abundance and species richness (Morris, 1979, 1981a, 1981b, 2000; Helden & Leather, 2004). Despite this, the relatively high level of open habitat and good dispersal ability of many species (Morris, 1990a) are likely to be important factors in maintaining grassland Hemiptera diversity within Bracknell.

ACKNOWLEDGEMENTS

The authors thank Dr Stuart McNeill for permission to use the Vortis suction sampler. Dr Bernard Nau provided draft copies of his key to the Miridae and Heteroptera checklist, and helped with the identification of several species. Assistance with identification was also provided by Dr Alan Stewart and Dr Ian Hodgkinson. We are very grateful to Bracknell Forest Council and Bracknell Town Council for allowing sampling on the eighteen sites, and to those in various council departments who provided assistance in the initial stages of the study. We would also like to thank Jane Helden and Terry Mawdesley for assisting with some sampling.

REFERENCES

- Andrén, H. 1994. Effects of habitat fragmentation on birds and mammals in landscapes with different proportions of suitable habitat: a review. *Oikos* **71**: 355–366.
- Andrén, H. 1999. Habitat fragmentation, the random sample hypothesis. *Oikos* **84**: 306–308.
- Andrzejewska, L. 1965. Stratification and its dynamics in meadow communities of Auchenorrhyncha (Homoptera). *Ekologia Polska—Seria A* **13**: 685–715.
- Arnold, A.J. 1994. Insect suction sampling without nets, bags or filters. *Crop Protection* **13**: 73–76.
- Badmin, J. 1981. *Athysanus argentarius* Metcalf (Hem., Cicadellidae) in Kent. *Entomologist's Monthly Magazine* **117**: 46.
- Badmin, J. 1991. Rediscovery of *Pediopsis tiliae* (Germar) (Hem., Cicadellidae) in Kent. *Entomologist's Monthly Magazine* **127**: 242.
- Badmin, J. 1994. An ancient woodland site for *Pediopsis tiliae* (Germar) (Hem., Cicadellidae). *Entomologist's Monthly Magazine* **130**: 226.
- Booij, C.J.H. 1981. Biosystematics of the *Muellerianella* complex (Homoptera, Delphacidae), taxonomy, morphology and distribution. *Netherlands Journal of Zoology* **31**: 572–595.
- Coddington, J.A., Young, L.H., & Coyle, F.A. 1996. Estimating spider species richness in a southern Appalachian cove hardwood forest. *The Journal of Arachnology* **24**: 111–128.
- Colwell, R.K. 2001. EstimateS: Statistical estimation of species richness and shared species from samples. Version 6.0b1. User's guide and publication published at <http://viceroy.eeb.uconn.edu/estimates>.

- Colwell, R.K. & Coddington, J.A. 1994. Estimating terrestrial biodiversity through extrapolation. *Philosophical Transactions of the Royal Society of London*, **B 345**: 101–118.
- Condit, R., Hubbell, S.P., Lafrankie, J.V., Sukumar, R., Manokaran, N., Foster, R.B., & Ashton, P.S. 1996. Species–area and species–individual relationships for tropical trees: a comparison of three 50-ha plots. *Journal of Ecology* **84**: 549–562.
- Davis, A.M. & Glick, T.F. 1978. Urban ecosystems and island biogeography. *Environmental Conservation* **5**: 299–304.
- Davis, B.N.K. 1976. Wildlife, urbanisation and industry. *Biological Conservation* **10**: 249–291.
- Davis, B.N.K. 1978. Urbanisation and the diversity of insects. *Symposia of the Royal Entomological Society of London*. Number 9. *Diversity of Insect Faunas* (ed. L.A. Mound & N. Waloff). pp. 126–138. Blackwell Scientific Publications, Oxford.
- Davis, B.N.K. 1991. *Insects on nettles*. Naturalists' Handbooks 1. The Richmond Publishing Co. Ltd, Slough.
- Denys, C. & Schmidt, H. 1998. Insect communities on experimental mugwort (*Artemisia vulgaris* L.) plots along an urban gradient. *Oecologia* **113**: 269–277.
- Duelli, P., Obrist, M.K. & Schmatz, D.R. 1999. Biodiversity evaluation in agricultural landscapes: above-ground insects. *Agriculture, Ecosystems and Environment* **74**: 33–64.
- Fauvel, G. 1999. Diversity of Heteroptera in agroecosystems: role of sustainability and bioindication. *Agriculture, Ecosystems and Environment* **74**: 275–303.
- Fernández-Juricic, E. 2000. Bird community composition patterns in urban parks of Madrid: The role of age, size and isolation. *Ecological Research* **15**: 373–383.
- Foggo, A., Atrill, M.J., Frost, M.T., & Rowden, A.A. 2003. Estimating marine species richness: an evaluation of six extrapolative techniques. *Marine Ecology Progress Series* **248**: 15–26.
- Gonzalez, A., Lawton, J.H., Gilbert, F.S., Blackburn, T.M. & Evans-Freke, I. 1998. Metapopulation dynamics, abundance, and distribution in a microecosystem. *Science* **281**: 2045–2047.
- Hawkins, R.D. 1989. *Orsillus depressus* Dallas (Hem., Lygaeidae) an arboreal groundbug new to Britain. *Entomologist's Monthly Magazine* **125**: 241–242.
- Hawkins, R.D. 2003. *Shieldbugs of Surrey*. Surrey Wildlife Trust, Pirbright.
- Helden, A. J. & Leather S. R. 2004. Biodiversity on urban roundabouts – Hemiptera, management and the species-area relationship. *Basic & Applied Ecology* **5**, 367–377.
- Hodkinson, I.D. & White, I.M. 1979. Homoptera: Psylloidea. *Handbooks for the Identification of British Insects* 2(5a). Royal Entomological Society of London.
- Ihaka, R. & Gentleman, R. 1996. R: A language for data analysis and graphics. *Journal of Computational and Graphical Statistics* **5**: 299–314.
- Jones, R.A. 1999. Entomological surveys of vertical river flood defence walls in urban London – brownfield corridors: problems, practicalities and some promising results. *British Journal of Entomology and Natural History* **12**: 193–213.
- Kirby, P. 1992. *UK Nature Conservation. No. 2. A Review of the scarce and threatened Hemiptera of Great Britain*. The Joint Nature Conservation Committee, Peterborough.
- Lawton, J.H. 1983. Plant architecture and the diversity of phytophagous insects. *Annual Review of Entomology* **28**: 23–39.
- Le Quesne, W.J. 1960. Hemiptera: Fulgoromorpha. *Handbooks for the Identification of British Insects* 2(3). Royal Entomological Society of London.
- Le Quesne, W.J. 1965. Hemiptera: Cicadomorpha (excluding Deltocephalinae and Typhlocybinae). *Handbooks for the Identification of British Insects* 2(2a). Royal Entomological Society of London.
- Le Quesne, W.J. 1969. Hemiptera: Cicadomorpha: Deltocephalinae. *Handbooks for the Identification of British Insects* 2(2b). Royal Entomological Society of London.
- Le Quesne, W.J. & Payne, K.R. 1981. Cicadellidae (Typhlocybinae) with a checklist of the British Auchenorrhyncha (Hemiptera, Homoptera). *Handbooks for the Identification of British Insects* 2(2c). Royal Entomological Society of London.
- Leston, D. & Scudder, G.G.E. 1956. A key to larvae of the families of British Hemiptera-Heteroptera. *The Entomologist* **89**: 223–231.
- Longino, J.T., Coddington, J., & Colwell, R.K. 2002. The ant fauna of a tropical rain forest: estimating species richness three different ways. *Ecology* **83**: 689–702.
- Magurran, A.E. 2004. *Measuring Biological Diversity*. Blackwell Publishing, Oxford.

- Malumphy, C.P. & Halstead, A.J. (2003) *Cacopsylla fulguralis* (Kuwayama), an Asian jumping plant louse (Hemiptera: Psylloidea), causing damage to *Elaeagnus* in Britain. *British Journal of Entomology and Natural History* **16**: 89–93.
- Malumphy, C., MacLeod, L. & Matthews, L. 2002. *Elaeagnus* sucker *Cacopsylla fulguralis*. *Plant pest notice No. 32*. Central Science Laboratory, Sand Hutton, York, UK.
- McIntyre, N.E. 2000. Ecology of urban arthropods: a review and a call to action. *Annals of the Entomological Society of America* **93**: 825–835.
- McIntyre, N.E., Rango, J., Fagan, W.F. & Faeth, S.H. 2001. Ground arthropod community structure in a heterogenous urban environment. *Landscape and Urban Planning* **52**: 257–274.
- Miller, D.J.P. 2001. *Deraeocoris flavilinea* (A. Costa) (Hemiptera: Miridae), new to Britain. *British Journal of Entomology and Natural History* **14**: 133–136.
- Morris, M.G. 1971. Differences between the invertebrate faunas of grazed and ungrazed chalk grassland. IV. Abundance and diversity of Homoptera-Auchenorrhyncha. *Journal of Applied Ecology* **8**: 37–52.
- Morris, M.G. 1973. The effects of seasonal grazing on the Heteroptera and Auchenorrhyncha (Hemiptera) of chalk grassland. *Journal of Applied Ecology* **10**: 761–780.
- Morris, M.G. 1979. Responses of grassland invertebrates to management by cutting. II Heteroptera. *Journal of Applied Ecology* **16**: 417–432.
- Morris, M.G. 1981a. Responses of grassland invertebrates to management by cutting. III. Adverse effects on Auchenorrhyncha. *Journal of Applied Ecology* **18**: 107–123.
- Morris, M.G. 1981b. Responses of grassland invertebrates to management by cutting. IV. Positive responses of Auchenorrhyncha. *Journal of Applied Ecology* **18**: 763–771.
- Morris, M.G. 1990a. The Hemiptera of two sown calcareous grasslands. I. Colonization and early succession. *Journal of Applied Ecology* **27**: 367–378.
- Morris, M.G. 1990b. The Hemiptera of two sown calcareous grasslands. II. Differences between treatments. *Journal of Applied Ecology* **27**: 379–393.
- Morris, M.G. 2000. The effects of structure and its dynamics on the ecology and conservation of arthropods in British grasslands. *Biological Conservation* **95**: 129–142.
- Morris, M.G. & Lakhani, K.H. 1979. Responses of grassland invertebrates to management by cutting. I Species diversity of Hemiptera. *Journal of Applied Ecology* **16**: 77–98.
- Nau, B.S. 2002a. Checklist of the Heteroptera of the British Isles. (Draft. Version 9th October 2002) (unpublished).
- Nau, B.S. 2002b. Keys to Miridae. (Draft. Version February 2002) (unpublished).
- Nau, B.S. & Brooke, S.E. 2003. The contrasting range expansion of two species of *Deraeocoris* (Hemiptera-Heteroptera: Miridae) in south-east England. *British Journal of Entomology and Natural History* **16**: 44–45.
- Ossiannilsson, F. 1981. The Auchenorrhyncha (Homoptera) of Fennoscandia and Denmark. Part 2: The families Cicadidae, Cercopidae, Membracidae, and Cicadellidae (excl. Deltocephalinae). *Fauna Entomologica Scandinavica* **7**: part 2. Scandinavian Science Press, Klampenborg, Denmark.
- Owen, J.O. & Owen, D.F. 1975. Suburban gardens: England's most important nature reserve? *Environmental Conservation* **2**, 53–59.
- Petersen, F.T., & Meier, R. 2003. Testing species-richness estimation methods on single sample collection data using the Danish Diptera. *Biodiversity and Conservation* **12**: 667–686.
- Rudd, H., Vala, J. & Schaefer, V. 2002. Importance of backyard habitat in a comprehensive biodiversity conservation strategy: a connectivity analysis of urban green spaces. *Restoration Ecology* **10**: 368–375.
- Salmon, M.A. & Chapman, J.W. 2000. On the history and distribution of *Athysanus argentarius* Metcalf (Hem.: Cicadellidae) in Britain. *British Journal of Entomology and Natural History* **13**: 91–93.
- Savard, J.-P.L., Clergeau, P. & Mennechez, G. 2000. Biodiversity concepts and urban ecosystems. *Landscape and Urban Planning* **48**: 131–142.
- Sedlacek, J.D., Barrett, G.W. & Shaw, D.R. 1988. Effects of nutrient enrichment on the Auchenorrhyncha (Homoptera) in contrasting grassland communities. *Journal of Applied Ecology* **25**: 537–550.

- Southwood, T.R.E. & Leston, D. 1959 *Land and water bugs of the British Isles*. Frederick Warne & Co., London.
- Steffan-Dewenter, I. & Tscharnkte, T. 2002. Insect communities and biotic interactions on fragmented calcareous grasslands—a mini review. *Biological Conservation* **104**: 275–284.
- Stewart, A.J.A. 1987. Interesting records. *Auchenorrhyncha Recording Scheme Newsletter Number 9*.
- Verdcourt, B. 1994. *Athysanus argentarius* Metcalf (Hemiptera, Homoptera, Cicadellidae) near Maidenhead, Berkshire. *Entomologist's Monthly Magazine* **130**: 225–226.
- Wagner, E. & Weber, H.H. 1964. *Hétéroptères Miridae*. Faune de France, 67. Fédération Française des Sociétés de Sciences Naturelles, Paris.
- Waloff, N. 1973. Dispersal by flight of leafhoppers (Auchenorrhyncha: Homoptera). *Journal of Applied Ecology* **10**: 705–730.
- Waloff, N. & Solomon, M.G. 1973. Leafhoppers (Auchenorrhyncha: Homoptera) of acidic grassland. *Journal of Applied Ecology* **10**: 189–212.
- Walter, B.A. & Morand, S. 1998. Comparative performance of species richness estimation methods. *Parasitology* **116**: 395–405.
- Whitmore, C., Crouch, T.E. & Slotow, R.H. 2002 Conservation of biodiversity in urban environments: invertebrates on structurally enhanced road islands. *African Entomology* **10**: 113–126.
- Zapparoli, M. 1997. Urban development and insect biodiversity of the Rome area, Italy. *Landscape and Urban Planning* **38**: 77–86.

***Gerris lateralis* Schummel (Hemiptera: Gerridae) in Hampshire.**—The Wildgrounds are part of the Alver Valley, Gosport, South Hampshire (VC11) (SU5800) and include an area of fen, with shallow flooded swampy ground dominated by *Carex acutiformis*. On the 26.iv.2005, I took several wingless pond-skaters at the base of the emergent sedges. These proved to be *G. lateralis*, which according to the recent Atlas (Huxley, 2003, *Provisional Atlas of the British Aquatic bugs (Hemiptera, Heteroptera)*). Huntingdon: BRC), are the first modern records from Hampshire. The previous most southerly record was made by Peter Kirby, in 1997 in Berkshire, close to the border with North Hampshire. I am unaware of any old Hampshire records.

These observations were entirely consistent with my previous experience of the insect in Cumbria and North Norfolk, with adults active on slimy mud and duckweed-covered shallow water.—JONTY DENTON, Kingsmead, Wield Road, Medstead, Hampshire, GU34 5NJ.

Dark form of Waved Carpet *Hydrelia sylvata* (D. & S.) (Lepidoptera: Geometridae) in Perry Woods, Kent.—A dark form of this Nationally Scarce B geometer was recorded in my Rothamsted light-trap in Perry Woods on the night of 5.vii.2005 (det. A. Pickles). This is the first record of this species from this locality following > 20 years of continuous light-trapping. Ferguson in his most recent *Kent Moth Report 2003* (2005) records *H. sylvata* from 16 ten-km squares in the county, indicating that it is now more widespread in the South-East than perceived a few years ago. Some of this range in-filling is due to more thorough recording, but also represents a noticeable spread of the moth. Its predilection for Sweet chestnut *Castanea sativa* probably accounts for its presence in Perry Woods and it will be interesting to see whether it becomes firmly established here. This was certainly the case for the Least Carpet *Idaea rusticata* (D. & S.) which first appeared in Perry Woods in 1994 and is now one of the most regularly appearing species of the genus. The records for 2005 show that it appeared on 16 nights during July–August with a total of 31 individuals.—JOHN BADMIN, Coppice Place, Selling, Kent ME13 9RP

**THE FIRST RECORD OF MULTIPLE ALLELOMORPHISM IN A
BRITISH BUTTERFLY: *COENONYMPHA TULLIA* (MÜLLER) SSP.
POLYDAMA (HAWORTH) (LEPIDOPTERA: SATYRIDAE)**

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ABSTRACT

Breeding work (carried out since 1988 by Martin White) with two unnamed ground colour aberrations of the Large Heath butterfly *Coenonympha tullia* (Müller) has revealed the first recorded instance of multiple allelomorphism in a British butterfly. Both colour forms have proven recessive to type. They show grey and orange ground colour, respectively. When the two aberrations are crossed together the F₁ generation contains 100% butterflies which exhibit a shimmering or translucent effect on an otherwise typically coloured background. Back crossing these hybrids with (typically coloured) individuals that were heterozygous for either grey or orange aberrations, produces an F₂ generation containing 50% typical: 25% either grey or orange: 25% translucent. This 2:1:1 ratio demonstrates that the grey and orange aberrations involve the same gene locus.

INTRODUCTION

Genes occur in pairs in Lepidoptera, one inherited from each parent. Each gene of a pair occurs at a particular location ('the locus') on its particular chromosome. Either gene in a pair may be typical or it may be a mutation. The alternative forms of a gene at a locus are termed alleles (Majerus, 1998). If a mutation occurs in a gene which codes for an element of the adult wing pattern or colouring, then the adult insect may display aberrant patterning or coloration. For example, many melanic forms of British moths are due to the existence of a mutant (frequently dominant) allele. However, a gene may not necessarily have just two alternative forms. In some cases there may be several alternative forms of a gene that may lead to various alternative wing patterns or colours. These alternative mutations are termed multiple alleles and the condition is called multiple allelomorphism (Majerus, 1998).

The most famous and well-studied example in the Lepidoptera occurs in the widespread African Mocker Swallowtail butterfly *Papilio dardanus* (Brown). The adult male has a black and yellow pattern, but the female occurs in a number of quite different forms, each one a mimic of an unpalatable model butterfly unique to its region. Each of these female forms is controlled by one of ten alleles at one locus (Ford, 1964; Nijhout, 1991; Majerus, 1998).

Multiple allelomorphism is also known from British moths, for example in the Pale Brindled Beauty *Phigalia pilosaria* (D. & S.). In this case the typical pale form, the fully melanic form *monacharia* (Staud.) and the intermediate form *pedaria* are all controlled by different versions of the same gene (Majerus, 1998). The condition has also been recorded in the tortricid *Acleris comariana* (Lienig & Zeller) (Ford, 1964; Majerus, 1998).

Despite British butterflies being such a well-studied group, multiple allelomorphism has not previously been recorded. In 1945, the geneticist E.B. Ford wrote 'The

phenomenon is of much interest from evolutionary and other points of view, and when found in a British butterfly, the fact should be published'.

MULTIPLE ALLELOMORPHISM IN *COENONYMPHA TULLIA*

This involves two very local colour forms which have not previously been named or described. They have been found in an isolated population on the Humberhead Levels (an area of lowland peat stretching from Goole Moors in North Lincolnshire, through South Yorkshire east of Doncaster, to Gringley Carr in Nottinghamshire). They are best described as butterflies in which the wing markings are unaffected, but which lack the typical 'cinnamon' ground colour of typical Humberhead specimens, centred on Munsell colour co-ordinates 7.5YR 5.5/7 (Munsell, 1994). (Munsell co-ordinates provide a standardised numerical reference system for identifying and comparing colours to a high degree of precision.)

One of the newly described colour forms has been captured on a few occasions in the past, but the other may be entirely new. As regards the Humberhead Levels, it is possible that this new aberration mutated or evolved in the same 'colony-enclave', together with a number of other distinctive ground colour forms, sometime after 1901 when a major drainage scheme isolated their parent sub-population from the main Humberhead Levels meta-population. Neither of the two forms, described below, nor indeed any of the other forms, have so far been observed or recorded from the main, much larger, ancestral population despite the enthusiastic activities of naturalists studying the species here for well over a hundred years. The genetic inheritance of the other (concomitantly occurring) forms remain unstudied. Further breeding work will therefore be needed to determine whether these are also controlled by separately mutated alleles at the same locus as the two forms described below.

THE TWO GROUND COLOUR FORMS

ab. lunaris

In this aberration the cinnamon ground colour is replaced by shades of grey (Plate 3 Figs 5–8 compared to typical specimens Figs 1–4). Three specimens of this aberration are held in the National Butterfly Collection at the Natural History Museum, London. Their data are as follows: Grange, 1904, W. Feather; Witherslack, 1905, F.W. Frohawk and Aviemore, 1915, S.G. Castle Russell. As regards the Humberhead Levels population, the earliest known example was a perfect male first noticed by Malcolm Simpson and subsequently captured by another observer on 8 July 1982. Between this date and 1998 a further 48 individuals were recorded or captured at an approximate ratio of 1 in 400 butterflies observed. Most of these original grey examples were, or have been, closely examined and in all but two cases scored a near monochromatic appearance (centred on Munsell: 10YR 5/3). The two remaining specimens, both male, exhibited a yellowish-green tint (10YR 5.5/4). The second of these 'yellowish-green' grey males (captured 27 June 1996) was captive-paired with reared virgin females and gave rise to a large part of the stock for this breeding programme.

A cross between a grey aberration and a typically coloured homozygote produces an F_1 generation all typical in appearance (all being heterozygotes) and an F_2 that contains 75% typical butterflies: 25% grey examples. This represents the classic Mendelian ratio for a recessive form of 1 typical homozygote: 2 typical heterozygote: 1 aberration, thereby proving that the grey aberration is recessive to type. Extensive breeding work has revealed considerable variation in the expression of the grey

aberration, from pure monochromatic grey individuals without a trace of typical cinnamon colour, through to those of a yellowish-green tint. This range currently models exactly the same shape in visible 'colourspace' (in terms of hue (wavelength), brightness (luminosity) and chroma (saturation)) as the corresponding range of variation and relative abundance in typical butterflies (including sexual dimorphism). This is perhaps to be expected, as the same set of modifier genes will be involved in controlling the expression of the ground colour in both the aberrant and typical butterflies. There is still, however, an obvious gap between the range of colour displayed by the grey butterflies and their typical counterparts.

ab. *ejecta*

This is the most striking colour form of the species yet discovered on the Levels. It is best described as having typical markings but a reduction in melanin pigments. The result is an orange butterfly with paler markings replacing the normally deep black rings around the eyespots (Plate 3 Figs 9–12). By comparison with the current colour dynamics of the grey form, far less variation has, so far, appeared within this aberration. Before 1994, variation in its wing coloration corresponded to just a single point in visible colourspace at 7.5YR 6/10, but now extends from here, through a series of intermediates, to approximately 7.7YR 5.5/9, contiguous with examples at the brightest extreme of the typical range.

The earliest known specimen of this form was a male captured by Reg Carter on 28 June 1981. Between this date and 1998 a further nine authenticated examples were recorded at an approximate ratio of 1 in 2000 individuals observed. Most of these aberrations, especially those taken before 1986, showed minor signs of wing-crumpling. However a perfect orange male, captured on 17 June 1999, was mated with home-reared virgin females, giving rise to most of the stock for this experiment. Subsequent back-crossings increased stock vigour and proved that this orange aberration is recessive to the type.

The release of progeny resulting from both *lunaris* and *ejecta* stocks between 1999 and 2003 by Martin White (under a licence issued by Butterfly Conservation) has increased the abundance of these rare aberrations in the wild and helped re-establish a new Humberhead Levels colony. As a result the yellowish-green forms of *lunaris* have now replaced the monochromatic form as the most commonly encountered grey 'sub-form' found in the wild.

CROSSING THE TWO FORMS

It was found that when the grey *lunaris* was crossed with the orange *ejecta* they gave rise to an F₁ generation made up entirely of a new (provisionally named) 'Rosy' aberration. The variability in hue, brightness and chroma of this aberration was exactly the same as that found in typical butterflies, but all 'Rosy' aberrations were characterised by a supplementary translucent or shimmering effect to varying degrees.

When one of these aberrations was back-crossed to a heterozygote of either *lunaris* or *ejecta* (typical in appearance due to the recessive nature of the aberrant alleles) the offspring closely followed the ratios of 50% typical specimens (all heterozygotes): 25% either *lunaris* or *ejecta* (depending on which heterozygote was introduced into the back-cross): 25% Rosy aberrations. This ratio of 2:1:1 was exactly as would be expected if *lunaris* and *ejecta* were due to mutations of the same gene. This demonstrates that these aberrations are the result of multiple allelomorphism.

Legend for Plate 3:

Allelomorphism in the Large Heath

1
typical male
upperside

2
typical female
upperside

3
typical male
underside

4
typical female
underside

5
male ab. *lunaris*
upperside

6
female ab. *lunaris*
upperside

7
male ab. *lunaris*
underside

8
female ab. *lunaris*
underside

9
male ab. *ejecta*
upperside

10
female ab. *ejecta*
upperside

11
male ab. *ejecta*
underside

12
female ab. *ejecta*
underside



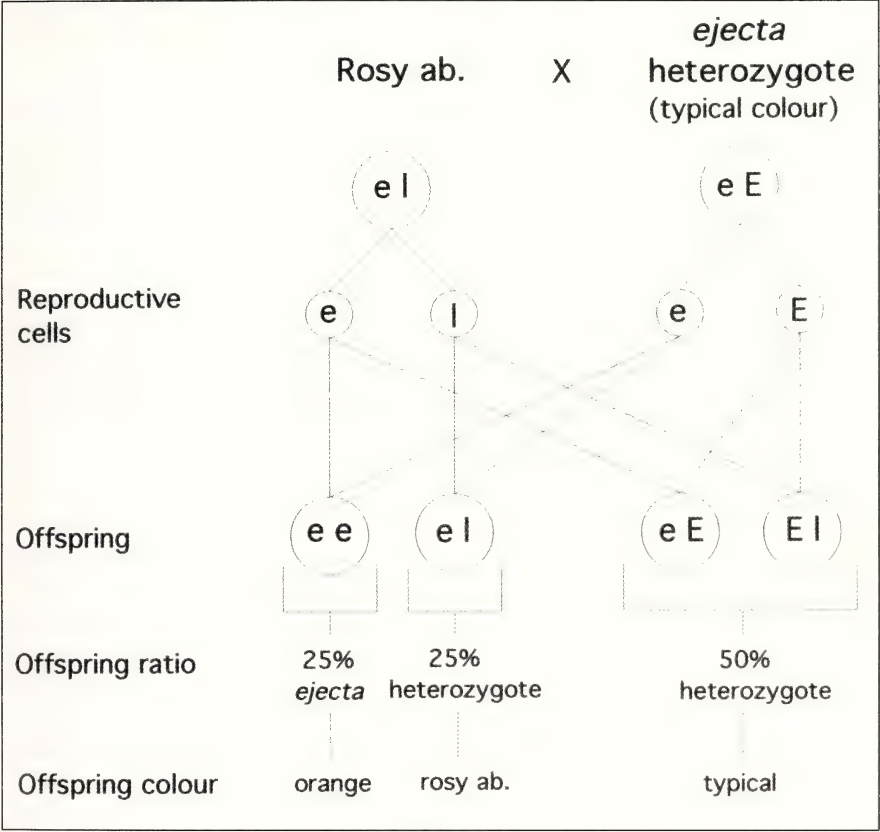
Allelomorphism in the Large Heath *Coenonympha tullia* ssp. *polydama*

The following genetic diagram illustrates such an experiment. In this example a Rosy aberration was back-crossed to an *ejecta* heterozygote.

E = typical ground colour allele

e = *ejecta* allele

l = *lunaris* allele



DISCUSSION

Ford (1945) wrote that it is to be expected that the aberrant alleles in a multiple allelomorph condition will usually show no dominance to each other. This means that when two aberrant butterflies are crossed together their offspring should be intermediate in appearance between the parents. Since 1945 various cases have been found in Lepidoptera (Majerus, 1998) and coccinelids (Majerus, 1994) in which there is dominance or semi-dominance between the different aberrant alleles. In such cases the F_1 adults take after one or other of their parents rather than being intermediate. However, the present situation illustrates a case similar to the one proposed by Ford (1945).

It is likely that multiple allelomorphism is common amongst other aberrations of British butterflies. Ford (1945) suspected that in the Small Copper *Lycaena phlaeas* (L.), the aberrations *schmidtii* (Gerhard) (creamy ground colour replacing the usual copper) and *alba* (Tutt) (pure white instead of copper) will prove to be multiple

allelomorphs. Probably any aspect of butterfly coloration that varies in a step-like way will be an example of multiple allelomorphism. For example, there are various aberrations in the Meadow Brown *Maniola jurtina* (L.) in which the colour of the normally fulvous forewing bands ranges from a paler version of the typical form through orange-yellow and towards pure white. There are the aberrations of the Pearl-bordered Fritillary *Boloria euphrosyne* (L.) and the Small Pearl-bordered Fritillary *B. selene* (D. & S.) in which the ground colour varies in the same manner (Russwurm, 1978).

However, the opportunities to carry out further experiments along the lines described above will be few and far between. Such aberrations are often rare and becoming more so as populations of many species dwindle in our ever diminishing countryside. Even if two suitable aberrations can be found there is then the challenge of maintaining them in captivity for long enough to determine their genetic make-up.

ACKNOWLEDGEMENTS

We are grateful to Martin Honey of the Natural History Museum, London for supplying the data from the three specimens of ab. *lunaris* in the National Collection. We also thank Malcolm Simpson and Reg Carter for information supplied over the years which has been drawn upon for this publication.

REFERENCES

- Ford, E.B. 1945. *Butterflies*. Collins, London.
 Ford, E.B. 1964. *Ecological genetics*. Methuen, London.
 Kettlewell, H.B.D. 1973. *The evolution of melanism: The study of a recurring necessity*. Clarendon Press, Oxford.
 Majerus, M.E.N. 1994. *Ladybirds*. HarperCollins, London.
 Majerus, M.E.N. 1998. *Melanism: Evolution in action*. Oxford University Press, Oxford.
 Munsell, A.H. 1994. *Book of Color*. Macbeth Instruments Corporation, New York.
 Nijhout, H.F. 1991. *The development and evolution of butterfly wing patterns*. Smithsonian Institution Press, Washington and London.
 Russwurm, A.D.A. 1978. *Aberrations of British butterflies*. Classey, Faringdon.

Library stock-taking at Dinton Pastures 2005–2006

The year 2004 saw advances in the computerised cataloguing of our library database at Dinton Pastures. From March 2005 onwards I have been conducting a thorough stock-taking of the Society's library holdings. This has included all books available on the shelves for general loan, the antiquarian books and all out-standing new acquisitions and bequests. All new holdings have been processed, labelled and added to the general stock on the shelves. This stock-taking is now nearing completion, but to facilitate the process and to aid completeness of the task I wish to ask all members with books or journals out on loan, especially those who may have had them for a considerable amount of time, to return these items to Dinton Pastures before the end of February 2006. This is most important and I would appreciate your cooperation in making the stock-taking as complete as possible. This will enable me to have a clearer picture of the current status of our holdings and where we may be deficient in subject matter.

IAN SIMS

THE INFLUENCE OF EMPTYING FREQUENCY OF PITFALL TRAPS ON THE CAPTURE OF EPIGEAL INVERTEBRATES, ESPECIALLY *PTEROSTICHUS MADIDUS* (COLEOPTERA: CARABIDAE)

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ABSTRACT

Pitfall trapping has many inadequacies but remains the most used method of collecting epigeal invertebrates. Trap data are often standardised to numbers per day, however, invertebrates already captured may cause attraction making this standardisation invalid. To test for attraction, pitfall traps were emptied at different frequencies and the impact on capture examined. The catch comprised 83% Coleoptera, of which 90% were *Pterostichus madidus* Fabricius. Traps which were emptied after six or nine days had higher capture rates of *P. madidus* than those emptied daily or every two or three days. Staphylinidae and Araneae catches were unaffected by emptying frequency.

INTRODUCTION

Pitfall trapping is the most frequently used method of collecting epigeal invertebrates in experimental studies because it is cheap and quick, allowing many samples to be taken (Adis, 1979). However, there are many well-known problems associated with the use of pitfall traps and although the technique provides some estimation of diversity for Carabidae (Ulber & Wolf-Schwerin, 1995) it is considered an unsuitable method for estimating abundance because the capture rate is a result of abundance, activity and species trappability (Greenslade, 1964; Luff, 1975). Observations of beetle behaviour at pitfall traps have highlighted many of their inadequacies (Halsall & Wratten, 1988). There have also been periodic reviews emphasising the need for caution when interpreting pitfall data (Luff, 1975; Adis, 1979; Sunderland *et al.*, 1995). In addition, many different forms of trap are used, containing a variety of trapping solutions, some of which are strong attractants, such as ethylene glycol (Holopainen & Varis, 1986; Weeks & McIntyre, 1997). Moreover, the number of days over which traps remain open often differs and this may create additional bias if attraction or repellency occurs, although whether emptying frequency influences capture rate has not been investigated. This information is needed if comparisons are to be reliably made between and within studies where the total capture has been adjusted to a number per trap per day. Information on emptying frequency may also be used to optimise sample size or used to ensure that no attraction occurs through the adoption of an appropriate emptying frequency.

Many of the problems associated with pitfall trapping were listed by Adis (1979), however emptying frequency was not discussed except for the recommendation that only season-long trapping should be conducted with an emptying frequency of 2–4 times a month. In many studies this is not logistically or financially possible and instead periodic trapping is conducted. In this study, the influence of the frequency of emptying pitfall traps on the total numbers of captured invertebrates was investigated in a pea field in southern England.

MATERIALS AND METHODS

An off-set grid of pitfall traps with 40×20 m spacing was set up across six arable fields in April 2000 in Dorset, UK (Holland *et al.*, 2004). A block of fifty sampling positions centrally located in one of these fields (a fodder-pea field) was utilised for this study. At each position, a single 6 cm diameter trap half-filled with 50% ethylene glycol solution was used, protected by a plastic rain cover mounted on nails. Ten positions were randomly allocated to five time treatments. The initial aim was to empty pitfalls and replace with new traps every 1, 2, 3, 6, or 12 days for a 12-day period, starting 24 July 2000. However, trapping had to cease after 9 days to allow farming operations to continue, therefore for data analysis trapping was considered over two time periods. All invertebrates were removed and stored in 70% alcohol. Carabidae and Staphylinidae were identified to species or genus, Araneae to family. Catches were totalled over the nine days for each position emptied every 1, 3 and 9 days. Catches were totalled over the first six days for traps emptied every 1, 2, 3 and 6 days. Totalled catches at each position were transformed to $\log_{10}(x + 1)$, and analysis of variance (ANOVA) applied for the major groups.

RESULTS

The catch comprised 83% Coleoptera, of which 90% was *Pterostichus madidus* Fabr. (Table 1). The other Carabidae captured were those typically found on arable farmland such as *Anchomenus dorsalis* Pontoppidan, *Amara* spp., *Calathus fuscipes* Goeze, *Harpalus rufipes* De Geer, *Loricera pilicornis* Fabr., *Notiophilus biguttatus* Fabr. and *P. melanarius* Illiger. Staphylinidae were predominantly *Philonthus cognatus* Stephens and *Tachyporus* species.

The frequency of emptying of traps had a significant effect on the catches of *P. madidus*, total Carabidae and total Coleoptera over both the six- and nine-day trials, and of *P. melanarius* in the nine-day trial (Tables 2a and b). No other coleopteran species was captured in sufficient numbers for statistical analysis. When *P. madidus* captures were excluded from the analyses then there were no significant effects for total Carabidae or total Coleoptera. In the six-day trial there were according to Fisher's LSD test significant differences in the capture rate for traps emptied every 1 ($P=0.001$), 2 ($P=0.015$) and 3 ($P=0.005$) days compared to 6 days (Table 2a). For the nine-day trial, capture differed significantly for traps emptied every 1 ($P=0.002$) and 3 ($P=0.005$) days compared to 9 days (Table 2b). However, the capture of *P. madidus* was found by regression analysis to significantly increase ($P=0.005$) as the emptying frequency was decreased (Fig. 1). Staphylinidae and Araneae catches were unaffected by emptying frequency.

Table 1. Composition of the total catch over nine days.

Group	N
<i>Pterostichus madidus</i>	6691
Other Carabidae	203
Staphylinidae	111
Other Coleoptera	431
Linyphiidae	1487
Other Araneae	34

Table 2. The frequency of trap emptying on the mean number of individuals (± 1 SE) per trap in a 6 and 9 day trial.

(a) Six-day trial emptied every 1, 2, 3 or 6 days

Emptying frequency	1	2	3	6	$F_{3,36}$	P
<i>P. madidus</i>	75 \pm 9	94 \pm 13	84 \pm 9	141 \pm 12	5.3	0.004
Carabidae	76 \pm 10	96 \pm 13	85 \pm 9	142 \pm 13	5.2	0.004
Coleoptera	82 \pm 11	103 \pm 15	95 \pm 11	149 \pm 13	4.7	0.008
Staphylinidae	1.3 \pm 0.5	1.7 \pm 0.6	0.8 \pm 0.2	1.6 \pm 0.4	0.6	>0.05
Araneae	26 \pm 2.8	24 \pm 3.0	22 \pm 2.4	21 \pm 3.4	0.6	>0.05

(b) Nine-day trial emptied every 1, 3 or 9 days

Emptying frequency	1	3	9	$F_{3,36}$	P
<i>P. madidus</i>	97 \pm 12	118 \pm 13	163 \pm 15	6.0	0.007
Carabidae	100 \pm 12	120 \pm 14	171 \pm 17	6.0	0.007
Coleoptera	110 \pm 14	134 \pm 15	181 \pm 17	5.6	0.009
Staphylinidae	1.7 \pm 0.6	1.0 \pm 0.4	3.7 \pm 1	2.7	>0.05
Araneae	33 \pm 4.3	29 \pm 3.1	31 \pm 3.1	0.2	>0.05

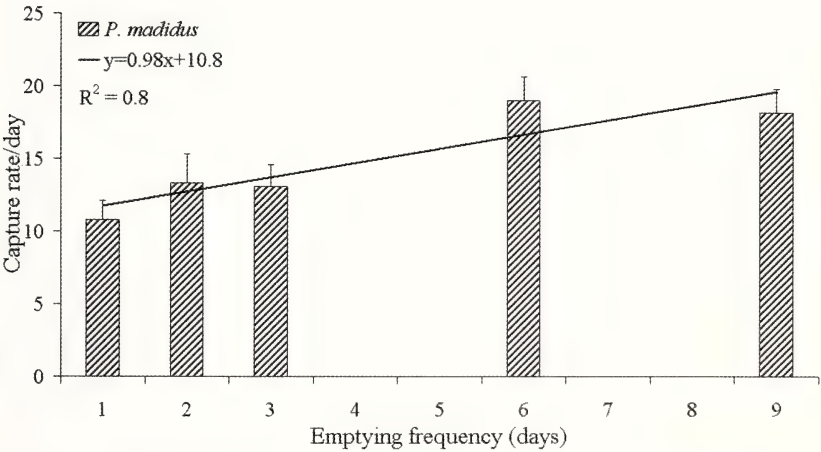


Figure 1. Effect of emptying frequency on the capture rate of *Pterostichus madidus*.

DISCUSSION

The carabid *P. madidus* dominated the catch of epigeal invertebrates, because this is a large active species which is readily captured in pitfall traps and it was also very abundant in this field at the time of sampling. The capture of *P. madidus* also increased if the traps were emptied less frequently indicating that attraction was occurring. Moreover, this attraction effect was most noticeable after six days indicating that this species was relatively sensitive to the presence of other beetles in the traps. This may have occurred through a variety of mechanisms. The beetles may

have been attracted to the odour generated from the dead beetles in the traps, which although masked to some extent by the preservative became more noticeable as the traps were emptied less frequently. Males may have been attracted to females captured in the traps but this would need verification. This has been found to occur with live pitfall trapping (Thomas & Sleeper, 1977). Dying beetles may emit an audio or chemical signal that attracts other beetles. Whatever the mechanism, demonstrating that attraction occurs has implications for how the data from pitfall trapping are interpreted. Further work is needed to verify whether attraction occurs for other species and between species, but it is likely that attraction will occur when other large carabid species (pers. obs.) are in abundance. Whether there is an interaction between the type of fluid used in the trap and emptying frequency also needs investigation, especially as it is already known that there is differential attraction between species using the same fluid (Adis, 1979). Whether the linear increase in attraction continues to increase beyond the nine-day period measured here also needs examining.

The study indicates that when emptying frequency differed between and within studies, converting total capture to a capture rate per day may generate some bias and should be avoided. Every effort should be made to standardise the emptying frequency within studies if numbers captured are to be measured. Even where season long capture is used, emptying frequency needs to be standardised within a study. Likewise, this should be done if a comparison is made with another study whilst also ensuring that all other factors known to influence capture efficiency, such as size of trap and preservative (Spence & Niemelä, 1994) are kept constant.

Despite the extensive research conducted on pitfall traps and their widespread use, there still remains considerable variation in their design and use. A standardised procedure and design as recommended by Adis (1979) has yet to be developed even though this would greatly enhance the opportunities for comparative ecological research.

ACKNOWLEDGEMENTS

The study was conducted as part of the 3D Farming Project which was funded under the Sustainable Arable LINK Programme by the Department for Environment, Food and Rural Affairs and Scottish Executive Environmental Rural Affairs Department with additional financial support from Dow AgroSciences, Home-Grown Cereals Authority, Horticultural Development Council, Processors and Growers Research Organisation, Tesco, Unilever, The Game Conservancy Trust, The Chadacre Agricultural Trust, The Dulverton Trust, The Manydown Company, The Worshipful Company of Farmers and The Yorkshire Agricultural Society. Our thanks to Sue Southway, Katherine Robinson, Matt Collier and Vicki Carter for assistance with field work and to Cranborne Estates for providing the study site.

REFERENCES

- Adis J. 1979. Problems of interpreting arthropod sampling with pitfall traps. *Zoologischer Anzeiger Jena* **202**: 177–184.
- Greenslade P. 1964. Pitfall trapping as a method for studying populations of Carabidae (Coleoptera). *Journal of Animal Ecology* **33**: 301–310.

- Halsall N.B. & Wratten S.D. 1988. Video recording of aphid predation by Carabidae in a wheat crop. *Brighton Crop Protection Conference: Pests and Diseases*, 1988. Vol. 3, pp. 1047–1052.
- Holland J.M., Begbie, M., Birkett, T., Southway, S., Thomas, S.R., Alexander, C.J. & Thomas, C.F.G. 2004. The spatial dynamics and movement of *Pterostichus melanarius* and *P. madidus* (Carabidae) between and within arable fields in the UK. *International Journal of Ecology and Environmental Sciences* **30**: 35–50.
- Holopainen J.K. & Varis A.L. 1986. Effects of a mechanical barrier and formalin preservative on pitfall catches of carabid beetles (Coleoptera, Carabidae) in arable fields. *Journal of Applied Entomology* **102**: 440–445.
- Luff M.L. 1975. Some features influencing the efficiency of pitfall traps. *Oecologia* **19**: 345–357.
- Spence J.R. & Niemelä J.K. 1994. Sampling carabid assemblages with pitfall traps: the madness and the method. *The Canadian Entomologist* **126**: 881–894.
- Sunderland K.D., De Snoo G.R., Dinter A., Hance T., Helenius J., Jepson P., Kromp B., Samu F., Sotherton N.W., Ulber B. & Vangsgaard C. 1995. Density estimation for beneficial predators in agroecosystems. *Acta Jutlandica* **70**: 133–164.
- Thomas D.B. & Sleeper E.L. 1977. The use of pit-fall traps for estimating abundance of invertebrates, with special reference to the Tenebrionidae (Coleoptera). *Annals of the Entomological Society of America* **70**: 242–248.
- Ulber B. & Wolf-Schwerin G. 1995. A comparison of pitfall trap catches and absolute density estimates of carabid beetles in oilseed rape fields. *Acta Jutlandica* **70**: 77–86.
- Weeks R.D. & McIntyre N.E. 1997. A comparison of live versus kill pitfall trapping techniques using various killing agents. *Entomologia Experimentalis et Applicata* **82**: 267–273.

SHORT COMMUNICATION

Heleodromia irwini* Wagner (Diptera: Empididae), an English boreo-alpine relict?—Heleodromia irwini* was first described (Wagner, 1985, A revision of the genus *Heleodromia* (Diptera, Empididae) in Europe. *Aquatic Insects* **7**: 33–43) from material collected on shingle and sand around the Dorback Burn [VC 95] and the European Alps. These and subsequent records from the Rivers Dee, River Lui and in Glen Derry (Falk & Crossley, 2005. A review of the scarce and threatened flies of Great Britain. Part 3: Empidoidea. *Species Status* **3**: 1–134. JNCC, Peterborough) suggest an exclusively boreo-alpine distribution with adults associated with exposed marginal sediments of upland rivers and streams. On 8.vii.2005 I found a male specimen at the edge of a narrow, shallow stream passing through an area of 'sugar' limestone but which originated from a small area of blanket bog immediately upstream on Widdybank Fell, Upper Teesdale (NZ 8130, VC 66). Upper Teesdale is well known for its relict boreo-alpine fauna and flora and it is suggested that this isolated occurrence of *H. irwini*, well removed from its Scottish and Alpine populations may be indicative of a post-glacial relict population marooned by retreating ice at the end of the last glaciation.—ADRIAN PLANT, Department of Biodiversity and Systematic Biology, National Museum of Wales, Cardiff, CF10 3NP.

REVIEWS

Larval foodplants of the butterflies of Great Britain and Ireland by Peter May. (The Amateur Entomologists' Society, Orpington, 2003), 56 pp. Softback £5.75. ISBN 0-900054-69-7.

This booklet aims to summarise the known larval foodplants of British butterflies, both those recorded in nature and those accepted in captivity. The format is simple, running through the species in taxonomic order with a brief introductory line or paragraph for each and a list of recorded foodplants below. There is a list of references, a section on further reading, a short list of entomological suppliers and an index. An additional article is included as a tribute to Peter Cribb, for many years a fulcrum of the AES and an expert butterfly breeder. It is called 'How to encourage butterflies to live in your garden'. It was originally published in the *AES Bulletin* in 1982.

The introduction to this booklet states that its purpose is to 'gather together in one place all the published records of known foodplants... in a way that will be helpful to both inexperienced and experienced entomologists'. It undoubtedly will be helpful, though with some qualifications.

The exact purpose of the introductory line or paragraph for each species is not always clear. Some state what is/are believed to be the main foodplant/s in the wild. These make a useful quick reference and are in line with the purpose of the booklet. However others simply make some general comment on the distribution of a species or its status under the Wildlife and Countryside Act 1981. In the latter case not all species so protected are noted as such. One is left uncertain when no comment has been made on preferred foodplants, whether this is because the species is generally polyphagous, its preferences are unknown, or they are known but simply have not been stated.

The lists of foodplants given under each species may be quite long. The introduction states that no attempt is made to list in order of preference due to the potential geographic variability of this choice. This is understandable, but apart from some of the introductory lines for each species, no attempt has been made to separate those foodplants on which larvae have been observed in the wild from the wider range accepted in captivity.

This booklet is undoubtedly a very useful resource for the butterfly breeder who may need to resort to alternative foodplants. It is recommended for this purpose as it circumvents the need to trawl through a wide range of references. However it has rather more limited use for field studies because one would need to go back to the original reference to see if a certain foodplant was recorded as being eaten in the wild, or only in captivity. This is a problem because there is no system of cross referencing between the foodplants listed and the source of that information. As a result, in order to discover the circumstances under which a species was recorded on a particular foodplant one would need access to all the references listed. Then there would be no alternative but to work through them until the record is found.

In conclusion this is a very useful booklet for the butterfly breeder but of more limited use to the field worker.

RUPERT BARRINGTON

OBITUARY

DR G. A. NEIL HORTON 1915–2005

Dr Neil Horton, who famously discovered the Silurian moth *Eriopygodes imbecilla* (Fabr.), new to Britain, died on 29 August 2005, aged 89.

Neil was raised in Monmouthshire, attending Newport High School. In his book *Monmouthshire Lepidoptera*, published in 1994, he talks of searching in his youth for butterflies at Llantar-nam and “The Plantations”, Croesyceiliog, (now the site of County Hall). He also had a great love of the Wye valley. His family had a long association with Redbrook in the Wye valley, where they ran the Redbrook Tinplate Co. (making the thinnest tinplate in the world!). The Angiddy Valley, above Tintern, was one of his favourite areas for entomology.

On completing his schooling, he went to Christ's College, Cambridge, where he obtained an MA degree. In addition to his medical qualifications, he studied for a degree in Botany and Zoology. After Cambridge and a period at St Bartholomew's Hospital in London he served as a doctor in the RAF in India, Burma and Ceylon.

Neil moved to Usk in the 1950s. In 1958 he moved within Usk to Plas Newydd where, running a light trap in his garden for 25 years, he accumulated a long list of first VC moth records (31 macros in all) and many county rarities. He also started trapping elsewhere in Monmouthshire and further afield, often in the company of his two great friends Dr John Bradley of the Commonwealth Institute of Entomology and Lieut.-Col. R.B. Humphreys. In addition to Lepidoptera he also recorded other insects, particularly Coleoptera, and was an excellent botanist. He was a frequent participant and visitor to various entomological societies' exhibitions and contributed several articles to entomological journals.

In 1968, Neil was invited by John Heath to be County Recorder and Referee for Monmouthshire butterflies and moths, a post he held for 27 years, but he is best remembered for the events of 1972. He was keen to investigate the upland moths of the north-west of the county, and on a fairly windy day (29 July) he looked at the



maps for sheltered sites and spotted an old disused quarry (Blaentillery Quarry) above Cwmtillery. The story goes that a car was parked in the quarry. Neil hammered on the window, telling the occupants that this is where he needed to put his trap. The occupants obviously thought he was a dangerous madman, and quickly acquiesced! A small, male, brown noctuid moth came to light which Neil did not recognise. It was subsequently identified by D.S. Fletcher of the British Museum of Natural History as *E. imbecilla*, a species new to Britain. Neil named it the Silurian after the previous human inhabitants of the area. It was confirmed as a British resident when further individuals were seen in 1976, and Neil used to tell many stories of how other entomologists tried to find the site. This year, 33 years after the first discovery, larvae of the Silurian moth have been found in the wild in Britain for the first time. It is sad that Neil died only four months later.

After retiring from practice as a GP in 1983, Neil moved to Llansoy where he had a magnificent view over east Monmouthshire and, still running a light trap, compiled another impressive species list for his new garden.

I first met Neil Horton in 1985. He and his wife, Sheila, were very kind with their hospitality and I thoroughly enjoyed the field trips with Neil, learning a lot about the best Monmouthshire sites. He also had an encyclopaedic knowledge about Monmouthshire in general. The slow onset of old age was evident though, and he became increasingly frustrated with his difficulty in seeing the detailed markings on specimens in the field and his decreasing dexterity in catching, handling and setting them. Eventually, about three years ago, his collection of Lepidoptera specimens was given to the National Museum of Wales in Cardiff.

Ever since its formation in 1963 Neil had a close association with the Gwent Wildlife Trust. He wrote several articles for the newsletter and in 1974 used the Trust to publish a leaflet on the *Butterflies and Moths of Wentwood* which sold for the princely sum of 10 pence. Twenty years later, the Trust encouraged him to write a county guide to Lepidoptera and helped seek funding for the project. Much of the credit must go to the late and much-missed Patrick Humphreys, then President of the Gwent Wildlife Trust. Patrick's company, Comma International Biological Systems, was used to publish the book. Ever the perfectionist, Neil regretted two aspects of his book. The photographers assigned to produce plates of Neil's set specimens were more used to dealing with commercial advertisements than biological specimens. The first set of plates was scrapped and Neil was still unhappy with the second attempt, but lack of time and money meant they had to be used—hence the “shadows” on some of the specimens. He also committed the cardinal sin of missing a typesetting error which led to his wife's name being misspelt in the dedications! Then, soon after publication in 1994, the company producing the book went into liquidation and the stock of unsold books disappeared, though copies have resurfaced in second-hand bookshops at Hay-on-Wye and elsewhere.

Eleven years on, *Monmouthshire Lepidoptera* is still regarded as a bible by local lepidopterists and I feel sure Neil would be delighted if he knew how much his book has done to stimulate interest in, and recording of, local butterflies and moths. We owe him a lot and his contribution will not be forgotten.

Thanks are due to Neil's son, Steve Horton, for providing the photograph of Neil and some of the information.

MARTIN ANTHONY

SHORT COMMUNICATIONS

Selective mortality of stag beetles in Orpington, Kent. – In Britain, the European stag beetle *Lucanus cervus* L. (Lucanidae) has traditionally been associated with broad-leaved woodland areas, however, two recent national surveys (Percy *et al.*, 2000; Smith, 2003) have demonstrated its strong presence in urban and suburban areas of south-east England where this nationally scarce species appeared to be fairly common. The Borough of Bromley in Greater London is one of those population hotspots.

I started collecting data on dead stag beetles in Orpington in June 2004 when a fellow commuter deliberately crushed one in front of me. All dead specimens and body parts were collected daily between June and August 2004. Approximately 30% of the patrolled route is made of public footpaths covered in tarmac and running between back gardens or crossing a park (Fig.1). Adult beetles are allegedly attracted to the warm surfaces of tarmac and pavements (London Biodiversity Partnership, 2000). Records (both live and dead) of stag beetle and lesser stag beetle *Dorcus parallelipipedus* L. are marked on the map. There were two clear zones (A and B, Fig. 1) with high concentrations of stag beetles separated by the most urbanised part of Orpington (zone C, Fig.1). Zone A is mainly houses with large gardens and small patches of broadleaved trees. The public footpaths run between back gardens and are partly lined with edges containing dead wood. This part of Orpington contained small woodland areas and orchards in the 19th century (Taylor, 1995). Zone A is probably much larger including the three isolated specimens found further north-east. The second zone includes part of a large park, a cemetery, small patches of broadleaved trees and a lane lined with edges containing clear oviposition sites. A high concentration of dead and live specimens was observed near a pile of decaying wood. The major changes in this area since the 19th century are the addition of a large road (Orpington bypass) and housing developments on fields (Taylor, 1995).

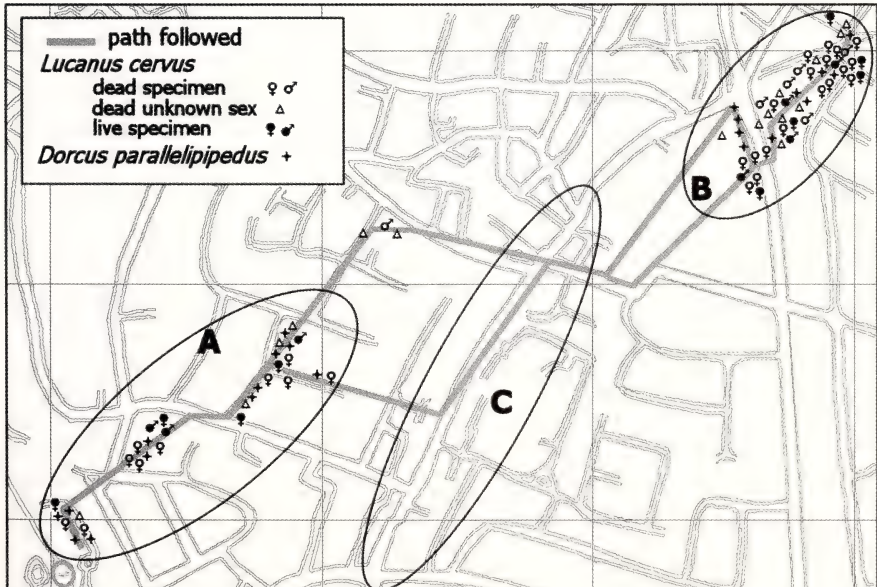


Fig. 1. Distribution map of *Lucanus cervus* and *Dorcus parallelipipedus* in Orpington, Kent. Zone C represents the only part of the town centre which can be classified as urban.

A total of 49 specimens was collected, including 19 thought to have been killed by pedestrians (19 ♀) and 23 by natural predators (4 ♀, 3 ♂, 16 non-identifiable). Secondary predation by black ants was observed in nine cases. Specimens which appeared to have been crushed by pedestrians were complete or nearly complete, usually with a broken pronotum and commonly had their reproductive organs outside their abdomen. Stag beetles killed by natural predators were incomplete, usually a single part of the body (elytron, leg) or different parts found in close proximity. Some specimens had clear evidence of tooth marks. A further six specimens (3 ♀, 3 ♂) were complete with no apparent signs of crushing and possibly died of natural causes. One incomplete female specimen apparently crushed by a pedestrian was probably first killed by a predator. In total, 25 complete or nearly complete specimens (3 ♂, 22 ♀) were collected. Sizes were in accordance with the literature (Harvey & Gange, 2003) with a median size of 33.8 mm (range 31–38 mm) for males and 36.3 mm (range 25–45 mm) for females. The smallest female was smaller than the largest male lesser stag beetle (29 mm including mandibles). This illustrates the identification problems encountered during the national stag beetles survey where smaller female *L. cervus* and large *D. parallelipedus* might be confused by the general public.

All the specimens assumed crushed by pedestrians were female. This fact could have three origins (or be a combination of the three): a bias in the collected data, the beetle's sex ratio and/or difference of behaviour between the sexes or the behaviour of the offender. The study is based on a small population size and the difference could be due to a sampling bias. It is hard to exclude this fact, but males were present in all the other sampled populations. However, this is just anecdotal evidence and not a solid proof.

The difference could be solely due to a higher proportion of females or a difference of behaviour between males and females. Such a difference in sex ratio in an area with an established population can be safely excluded: during the same period over 50% of stag beetles observed during the 2002 national stag beetle survey were males (Smith, 2003). However, if the females were to be found far more commonly on the ground than males (especially on tarmac areas) this might explain the difference. There is no indication in the 1998 and 2002 surveys to back-up this assumption. Furthermore, during this study seven out of 16 live *L. cervus* observed on the ground were males and six out of 14 of the identifiable *L. cervus* collected (excluding obvious death by crushing) were males. Finally, in *D. parallelipedus*, where it is harder for members of the general public to differentiate between sexes, eight out of 13 of the crushed specimens were males.

Finally, the difference could be explained by human behaviour: pedestrians might be more likely to kill female stag beetles. Such a statement seems blunt, but one could develop different theories to explain this. People might, for example, recognise male stag beetles but not females and therefore make a conscious effort of avoiding males but not females. An alternative theory, proposed by one of my colleagues, is that people probably do not recognise either but will not go near male stag beetles because of their more "fearsome" look.

To test this hypothesis, a small survey of the local residents and people using those public footpaths was carried out with the help of my wife. The main aim of the questionnaire was to establish if people could recognise male stag beetles more readily. It included questions about their perception of stag beetles (national and local distribution) and details on if and where they had seen a stag beetle. They were then asked to identify *L. cervus* from fifteen drawings of insects (mainly Coleoptera). The overwhelming majority (93%) of the 104 persons who answered "knew" what a stag beetle was and "had seen" (77%) a stag beetle (72% a live specimen, 28% a dead one, a third of the sightings occurred this year, over 80% in an urban or suburban

environment). Interestingly, people did not know the sex of the specimen in the majority of cases (69%). When asked to identify *L. cervus*, male stag beetles were the most common answer but represented by less than a third of the total answers (29%) but it was nearly three times more often than the females (11%). The two most incorrect answers were the cockchafer *Melolontha melolontha* (L.) and the rose chafer *Cetonia aurata* (L.) (18% each), while *D. parallelipipedus* was chosen in 8% of the cases. Nearly 50% thought that stag beetles were common in England (25% had no idea), and none considered it endangered or protected. In terms of local distribution 60% had no idea, 20% thought the species was rare and 20% common. However, the results of such a small public survey should not be considered as concrete evidence that the females are more targeted than the males.

It is hard to assess the overall effect of pedestrians on urban population of stag beetles. Other human activities such as cars or even grass mowing equipments (Jones, 2001) are known to kill stag beetles; and there is little doubt that the biggest damage is done through the destruction of suitable habitats. Unlike cars or machinery, this loss of beetles could easily be reduced through education leading to a better recognition of the species.—MARC E. MIQUEL, 7 Albert Road, St Mary Cray, Orpington BR5 4AF. (marc.miquel@kcl.ac.uk)

REFERENCES

- Harvey D. & Gange A. 2003. Presentation on size variation in the stag beetle. *Proceedings of the second pan-European conference on saproxylic beetles*. London, People's Trust for Endangered Species.
- Jones R. A. 2001. Grass-mowing machinery, an important cause of stag beetle mortality in a south London park. *British Journal of Entomology and Natural History* **14**: 221–223.
- London Biodiversity Partnership 2000. *Species action plan: stag beetle*. London Wildlife Trust http://www.lbp.org.uk/03action_pdfs/ac20_stagbeetle.pdf
- Percy C., Bassford, G. & Keeble, V. 2000. *Stag Beetles. Findings of the 1998 National Stag Beetle Survey*. London, People's Trust for Endangered Species.
- Smith M. N. 2003. *National Stag Beetle Survey 2002*. London, People's Trust for Endangered Species.
- Taylor P. 1995. *Old Ordnance Survey Maps—Orpington 1868*. Alan Godfrey Maps, Gateshead.

The recent occurrence of *Sturmia bella* (Meigen) (Diptera: Tachinidae) in south-west England, including rearings from two host species of Nymphalidae.—In late summer 2003 I reared five examples of a tachinid fly which I could not identify using the Royal Entomological Society key of Belshaw (1993). I sent two specimens (♀, ♂) to the Natural History Museum whereupon Nigel Wyatt determined them as *Sturmia bella* (Meigen). These two examples are now in the Natural History Museum collection. This parasitoid fly was first recorded from the UK from Hampshire in July 1998, a male being reared from a pupa of *Inachis io* (L.) (Ford *et al.*, 2000).

Collection details: six larvae of *Aglais urticae* (L.) (Nymphalidae) were collected on 3.viii.2003 in a field amongst farmland, Dawlish, Devon (SX 9577). One of these produced two ♂♂ *bella* adults early ix.2003; a second individual (as a pupa) gave one ♀ *bella*, also early ix.2003.

Seven larvae of *Polygonia c-album* (L.) (Nymphalidae) were collected on 25.viii.2003 from *Ulmus* on a cliff-top path, Dawlish (SX 9777). One of these gave, from the pupa, two larvae of *S. bella* (tachinid larvae appearing 29 and 30.viii), with two adults (♀♂) hatching on 12.ix.2003.

The next encounter with *S. bella* occurred on 24.vii.2004, when I captured three ♂♂ on flowers of *Pastinaca sativa* (L.) (Wild Parsnip) at Studland, Dorset.

On 29.vii.2004 I collected 28 almost full-grown larvae of *A. urticae* at Dawlish (SX 9577) two fields away from where the first sample was collected in 2003. I had noted these as very young larvae on 17.vii.2004 but declined to take them at this stage. The larvae were divided into two batches of 14, five of one batch died from unspecified causes; of the remaining, 22 pupated over the period 1–3.viii.2004. All 22 pupae gave *S. bella* larvae. The remaining host larva yielded five slightly smaller tachinid pupae; three of these were of *S. bella*.

The tachinid maggots all appeared 4–5.viii.2004; as they emerged from the suspended host pupae they provided a glistening impermanent 'thread' which seemed to assist their descent from the *urticae* pupae.

The 22 *A. urticae* pupae produced 23 *bella* larvae (so, as in 2003, one pupa yielded two *bella* larvae). The incidence (rare, apparently) of multiple occupancy of *S. bella* in a host was further confirmed when three of the five tachinid pupae ex. the *urticae* larva yielded *bella* adults; a fourth pupa produced a ♀ *Phryxe* sp. [either *P. vulgaris* (Fallén) or *P. magnicornis* (Zetterstedt) (Tachinidae)]. The fifth pupa has (so far) failed to hatch. All the tachinid adults were bred 12–13.viii.2004.

A total of 26 *bella* adults were bred: 10 ♀♀, 16 ♂♂ including 1 ♀, 2 ♂♂ from one *A. urticae* larva.

The high rate of parasitism (23 of the 23 surviving larvae) may have implications for local populations of selected nymphalids.

The details above provide the first known records for *S. bella* in Dorset and Devon. Additional records are cited below:

Six larvae of *P. c-album* collected on 2.vi.2004, Dawlish (SX 9777) failed to yield *bella* (all produced butterflies); I was unable to find any second brood *P. c-album* larvae at this site. Thirty larvae of *Inachis io* (L.) collected in the same locality on 2.vi.2004, gave either butterflies (~50%) or a *Phobocampe* sp. (Hymenoptera: Ichneumonidae).

During August–October 2004 I encountered several more adults of *S. bella*, all female. Two of these records (*) were from new localities. The species is evidently on the wing well into the autumn and is obviously well established in South Devon.

Collection details: all 2004, Devon. All single captures unless indicated.

*Little Haldon (SX 9376) 31.viii. –laneside herbage near moorland. *Newton Abbot (SX 8572) 1.ix. –amongst nettle on a shaded path on semi-marshland. Dawlish (SX 9777): 2.ix (2♀♀); 7.ix (2♀♀), 30.ix., 7.x, and 8.x (all around nettles on a cliff-top path along which elm grows). Dawlish (SX 9577): 19.ix. –amongst nettle from where parasitised *A. urticae* larvae had been found.

All of the above adults were easy to capture: no net was necessary. It is interesting to speculate how *S. bella* overwinters. It gains entry to its hosts by laying ova on foodplants: these are swallowed by the host larva and hatch in the gut (Herting, 1960). Larvae of its above nymphalid hosts are unavailable until spring. A published record (Chandler *et al.*, 2001) refers to a male *S. bella* being reared from *Pararge aegeria* (L.) [Nymphalidae] in March –the host pupa being found in February.

The author is indebted to Nigel Wyatt, of the Natural History Museum, for determining the original specimens, and for describing how to recognise future examples. Additional information provided by Nigel Wyatt, Matt Smith and Peter Chandler is gratefully acknowledged.

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REFERENCES

- Belshaw, R., 1993. Tachinid flies. *Handbooks for the Identification of British Insects* Vol. 10 Part 4(a)(i). Royal Entomological Society, London.

- Chandler, P., Ford, T. H. & Falk, S., 2001. *Blepharipa schineri* (Mesnil) new in Britain and notes on recent additions to the British Tachinidae (Diptera). *Dipterists' Digest* 8: 11–17.
- Ford, T.H., Shaw, M.R. Robertson, D.M. 2000. Further host records of some west Palaearctic Tachinidae (Diptera). *Entomologists' Record and Journal of Variation* 112: 25–36.
- Herting, B. 1960. Biologie der westpaläarktischen Raupenfliegen (Dipt., Tachinidae) Monographien zur agnew. *Entomologie* 16: 1–188.

Records of Hemiptera from England in 2001–3.—This note summarises records of scarce Hemiptera from Southern England in 2001–3, including some new Vice-County records.

South Hampshire (VC11) Two males of *Calligypona reyi* (Fieber) (Delphacidae) were swept from *Scirpus* and *Juncus* with *Paralimnius phragmitis* (Boheman) (Cicadellidae) in a marshy area behind a belt of stable shingle at Gilkicker Point (SZ6097), 2.viii.2002; new to Hampshire. **West Sussex** (VC13) Adult *Pediopsis tiliae* (Germar) (Cicadellidae) on large isolated *Tilia* × *vulgaris*, and *Raptalus panzeri* Löw (Cixiidae), abundant in open deer grazed parkland pasture, Petworth Park (SU9622), vii–viii.2001. **Surrey** (VC17) *R. panzeri*, several in revegetating pit, Holmethorpe Sandpits (TQ2951), 14.vii.2001. *Asiraca clavicornis* (F.) (Delphacidae) abundant on a flower rich bank, Wimbledon Common (TQ2272), on 18.vi.2001. **Berkshire** (VC22) *P. tiliae* on mature lime *T. × vulgaris*, at Burghfield Mill (SU6770) on vi–vii.2003. *Euscelidius variegatus* (Ribaut) (Cicadellidae) at light trap, Sheffield Bottom (SU6569) on 7.viii.2003. According to Kirby (1992) this species is restricted to the coastal counties along the south coast and Yorkshire, Norfolk and Suffolk, with no previous Berkshire records. *Macrosteles quadripunctulatus* (Kirschbaum) (Cicadellidae) in MV light-trap at Sheffield Bottom (SU6569) on 7.viii.2003. According to Kirby (1992), only known from six sites, including Silwood Park in Berkshire. Two males of *Ribautodelphax angulosus* (Ribaut) (Delphacidae) were swept from dry grassland at Field Farm (SU6770) close to the River Kennet, on 15.vii.2003. **Mid-West Yorkshire** (VC64) Two males of *Calligypona reyi* (Fieber) (Delphacidae) were swept from *Juncus* in a marshy area on the site once occupied by Fryston Main Colliery (SE4426) on 4.vi.2004; new to Yorkshire. A large reed bed on the site also supported *Chloriona dorsata* Edwards and *C. glaucescens* Fieber (Delphacidae). — JONTY DENTON, Kingsmead, Wield Road, Medstead, Hampshire GU34 5NJ.

REFERENCE

- Kirby, P. 1992. *A review of the scarce and threatened Hemiptera of Great Britain*. UK Nature Conservation No. 2. Joint Nature Conservation Committee, Peterborough.

Southern bush-cricket *Meconema meridionale* Costa (Orthoptera: Tettigoniidae) in Kent.—On 6.ix.2005 a male *Meconema meridionale* was found on a tomato plant growing against the south facing wall of the author's house in Gravesend Kent TQ6773. This was the only specimen found. The bush-cricket was readily identified by reference to Hawkins, 2001, *British Journal of Entomology and Natural History*, 14: 207–213. The male cerci are distinctive. Hawkins (op. cit.) details the first British records of this species found in 2001 in Surrey and Berkshire. Whether the Kent specimen represents a further consolidation of the range of this species, or another introduction, is unknown. — M. T. JENNINGS, 206 Lower Higham Road, Gravesend, Kent, DA12 2NN.

***Sericomyia silentis* (Harris) (Diptera: Syrphidae) reported from Northamptonshire.** – The large hoverfly *Sericomyia silentis* is a common and generally widespread species in Britain, with almost 3000 records from some 830 10 km grid squares included in the *Provisional Atlas of British Hoverflies*. However, a glance at the distribution map in the *Atlas* reveals large tracts within which this fly is very local, or even, apparently, absent. In particular it seems to be a rare insect in the south and east midlands of England.

It was, therefore, a pleasant surprise to be shown a specimen of *S. silentis* netted on 09.vi.2005 by Dr Kathleen Ann Smith from a restricted wetland area included in the Lings Wood LNR, Northampton (Grid ref. SP 803641). The fly was spotted at rest on tall vegetation adjacent to the “Dew Pond” part of the reserve. This is a small, very shallow pool, tending to dry out in summer, surrounded by deciduous woodland, and well encumbered with dead logs and other debris (thanks to the activities of youths from adjacent estates). Lings Wood mostly grows on a fine, podsolic sand, which would probably have supported heathland in the 19th century before trees were planted.

This may be the first record of *S. silentis* from Northants. (VC32); there are not even any dots on the *Atlas* map from the Peterborough area, much better recorded for hoverflies than the rest of the county.

I am grateful to Dr Smith for permission to publish her record, and to the Beds., Cambs., Northants and Peterborough Wildlife Trust for encouraging insect recording on reserves such as Lings Wood. – GAVIN BOYD, 91 Fullingdale Road, Northampton NN3 2PZ.

INDOOR MEETINGS

8 March 2005

The President, Dr M. R. WILSON announced the deaths of Dr D. H. Howton, Professor Sir John Dacie and Dame Miriam Rothschild.

The following persons were approved as members by Council: Miss Arabella K.L. Bramley, Dr Andrew W. Coleman, Dr Roy C. Hilton, Mr Adrian P. Knowles, Mr Michael Massie and Mrs Emma Ross.

The President reported on a discussion with a colleague concerning the date of arrival in Britain of the grey squirrel flea. He wondered whether there had been any deliberate introductions of insects into Britain that has succeeded in becoming established. Several suggestions were made, including continental strains of the Large Copper and Large Blue butterflies, non-native strains of the honeybee and some insects introduced as biological controls for pests, such as *Rhizophagus grandis* (Gyll.) for the control of the great spruce bark beetle, *Dendroctonus micans* Kug.

The Ordinary meeting was then followed by the AGM and the Presidential Address.

10 May 2005

The President, Dr M. TELFER, opened the meeting.

Mr A. J. HALSTEAD showed some live flower chafer beetles, *Oxythyrea funesta* (Poda) sent to him from a garden in Provence, France, where they were damaging rose flowers. This species does not occur in Britain.

Dr M. TELFER showed a specimen of the bombardier beetle, *Brachinus crepitans* (L.) (Carabidae). This local beetle was taken on 3.v.2005 at Rye Harbour, Sussex.

The following persons were approved as members by Council: Mr Richard P. Chadd, Mr Paul B. Chapman, Mr I. Jim Fairclough, Mr Andy M. Harmer and Mr Derek J. Mills.

Dr J. MUGGLETON announced that the Society's Curator, Peter Chandler, was due to receive the H. H. Bloomer Award, presented by the Linnean Society, on 24th May. This is awarded for an outstanding contribution to Natural History in a non-professional capacity.

Dr PHILIP PUGH spoke on Mr Pye's shells—a rescued Victorian collection. The study and collection of shells is known as conchology and it has a long history. Shells of marine molluscs have been found in stone-age graves hundreds of kilometres from the nearest coast. Two houses excavated in Pompeii had shell collections with specimens from as far away as the Red Sea and the Indian Ocean. The first British books on shells were published in the 17th and 18th centuries. Interest in shell collecting increased in the 19th century as increasing international trade and travel opened up new areas for collecting. Many collections were amassed by collectors buying specimens from dealers, with the trade in exotic shells continuing well into the twentieth century. Around 1980, increasing concern about conservation led to some countries placing bans on the export of shells and introducing regulations on the trade.

The speaker's introduction to the Pye collection came about when he attended a lecture on Invertebrate Surveying given by Roger Key. After the lecture, Dr Key mentioned that the Lincolnshire Naturalists' Union had a Victorian shell collection in store in a Lincoln museum. It needed a new home because the museum was being renovated and items considered to be not relevant to Lincolnshire were being cleared out. The collection was housed in three cabinets and contained about 6000 specimens. The collector, Alfred William Pye was born at Clee, near Grimsby in 1861 but little else is known about him.

The collection was in need of cleaning and conservation. The shells have been degreased by gentle washing in water and detergent, soaking and rinsing, followed by slow air drying. The original labels were on pieces of paper that had become very dirty. The data have been transcribed on to a spreadsheet and edited into a single database. About half the shells were damaged but the rest were in good condition. Of the original collection, about 2800 shells have been transferred to metal cabinets. The rest have been given away as reference collections to students at the Anglia Polytechnic University or to children visiting the annual Cambridge Natural History Conversazione.

Mr Pye's collection had most of the specimens named but no information on where and when they were collected. This lack of provenance data means that the collection is of little interest to museums. Pye's collection has some species that are now extinct and some that must have been collected before these species had been formally described and named. The principal areas from which Pye's specimens had come were marine molluscs from Western America, the Caribbean, the Red Sea and East Africa, South Australia, South west Pacific and New Caledonia. Land mollusc shells included those from the Philippines and Hawaii. In the future, the Pye collection, now in the ownership of the speaker may be made available to the public through the medium of digital images on a website.

The speaker warned modern shell collectors who buy specimens from dealers or on e-bay to check the provenance to ensure they were collected ethically and not in contravention of CITES regulations.

FIELD MEETINGS

Bernwood Forest, Buckinghamshire, 22 May 2004 – National Moth Night

Leaders: **Paul Waring (PW)** & **Martin Albertini** – This field meeting was the third attempt by the BENHS to find the False Mocha *Cyclophora porata* (L.) at Bernwood Forest in recent years. The previous attempts on 24 August 2002 and 24 May 2003 were unsuccessful. On the 2002 meeting 17 light-traps were operated but the evening session was preceded by a heavy downpour and resulted in very small light-trap catches. Many species which were known to be present were not seen in the catches. The second meeting was successful in recording the Orange Footman *Eilema sororcula* (Hufn.) for the second year running, after many years without a sighting. Russell Bretherton had recorded a singleton of the moth in Hell Coppice on 12 May 1944 and one across the road in Waterperry Wood on 23 May 1943. The last prior to 2001 was one captured in Hell Coppice by Roger Clarke at m.v. light on 14 June 1958 and retained in his collection. The 22 May 2004 was National Moth Night and because the False Mocha was one of the target species, the leaders resolved to make another attempt to find the moth at Bernwood, where it was recorded annually in small numbers from 1984-1986 but had not been seen since (Waring, 2002).

As always at this site, this meeting was held jointly with the Buckinghamshire Invertebrate Group and the Moths of Oxfordshire Recording Scheme (MORSE) and was very well attended, fifteen of us all together. On this occasion it was a night meeting only. Patrick Boston, David Maunder and I were all early to arrive which enabled us to beat in good light (20.00–20.25h) for larvae of the Barred Tooth-striped moth *Trichopteryx polycommata* (D. & S.) along the roadside edge of Hell Coppice and in the hedge on the opposite side of the road, in both of which there is abundant Wild Privet *Ligustrum vulgare* the main larval foodplant (Fig. 1). Unfortunately, despite a thorough beating of the accessible privet, we found none. We did however obtain a larva of Svensson's Copper Underwing *Amphipyra berbera svenssoni* Fletcher with a distinctive red tip to its tail, and this larva continued to feed on privet in captivity. Russell Bretherton and E.B. Ford recorded finding eight adult Barred Tooth-striped sitting on small bushes of *L. vulgare* in the hedgerow on the southern edge of Hell Coppice after dark on 15 March 1938 and many more on 17 March 1938 but they noted that they did not come to the car headlights unlike other moths were doing (Bretherton, 1940, 1941; diary extracts). When Maitland Emmet visited the site on 28 March 1950 he found a number of Barred Tooth-striped moths here, two of which are now in PW's collection. Both specimens are labelled Hell Coppice. They were acquired by PW from Maitland's collection at the duplicates day held by BENHS at Dinton Pastures on 17 April 2004 when specimens surplus to the requirements of the Society were disposed amongst members. These records of Maitland's appear to be the last of the species from Bernwood Forest (Waring, 1990).

A possible reason for the decline or disappearance of the Barred Tooth-striped from this woodland edge was suggested by observations made on this field meeting. Both the hedge and verge had evidently been trimmed back hard to maintain road visibility around the entrance to the wood and the curves in the road. Many of the trimmings were still lying green on the ground so the operation must have taken place in the week before the meeting, at a time when it may have impacted on any larvae. This trimming happens most years and perhaps over time losses have been more than the populations could withstand. Dunk (1956) reports a more likely cause for the apparent loss however, namely serious damage and destruction of the



Fig. 1. Hell Coppice, Bernwood Forest, Bucks. 22 May 2004. Beating for larvae of the Barred Tooth-striped moth on wild privet on roadside, which has been tightly trimmed.

hedgerow by the Forestry Commission in the early 1950s shortly after they acquired the site. This was followed by spraying of broad-leaved woody plants with herbicides on a number of occasions during the 1960s to prevent native trees and shrubs competing with the newly planted conifer crops (Cribb, 1962). A fairly comprehensive list and partial collection of macro-moths from Bernwood Forest and its environs were made by Roger Clarke during the 1960s but the Barred Tooth-striped was absent from both. On several occasions between 1984 and 1986 PW searched both the roadside hedge and a couple of other stands of *L.vulgare* within Oakley and Shabbington Woods in the hope of rediscovering adults or larvae of this species, but without success. But he has still not given up hope that it may survive somewhere on this 450ha site.

A total of six Robinson traps and two actinic Heath traps was set up just before dusk fell. All of these were in the Oakley Wood part of the site where PW had seen the False Mocha regularly from 1984–1986. For the record, a 6W actinic Heath trap was placed at FC ride intersection 7 (the southern of the two in Oakley Wood) in exactly the same place, and of exactly the same design as the trap used at least weekly by PW in this position in 1984 and 1985, so that the results could be compared with catches from twenty years ago (Fig. 2). Two Robinson traps were operated in the ride heading east from this intersection, two more in the main ride heading north to the next intersection, a Robinson in the ride heading east from the latter, an actinic in the ride heading west from this and a Robinson trap in FC compartment 12 in a recently coppiced portion between the two intersections. As dusk fell various members of the group patrolled around any low oak foliage and walked the rides with nets looking for *C. porata*, which are sometimes seen on the wing at this time.



Fig. 2. Oakley Wood, Bernwood Forest, Bucks. 22 May 2004. Actinic trap in FC Ride Intersection 7.

At 22.50h a singleton of the closely-related Maiden's Blush *Cyclophora punctaria* (L.) was netted on the wing and another was seen arriving at one of the traps at 22.30h, along with several Cockchafers *Melolontha melolontha* (L.). Other moths netted on the wing at dusk included several Green Carpet *Colostygia pectinataria* Knoch, two Brimstone moth *Opisthagraptis luteolata* (L.), two Common White Wave *Cabera pusaria* (L.), two Red Twin-spot Carpet *Xanthorhoe spadicearia* (D. & S.) and the most noteworthy - three Small White Wave *Asthenes albulata* (Hufn.), which PW had indeed recorded here two decades previously and had beaten as larvae from the hazel understorey. No False Mocha were seen in this exercise however. It is worth noting that small saplings and bushes of oaks are now harder to find than in the mid-1980s, because all the trees and shrubs have grown larger in the last two decades and have extended further up and into the ride edges, where the smaller oaks were mainly found. Even in the small coppiced plot, which is rather shaded by trees, the regrowth is mainly hazel and small oaks, which *C. porata* is believed to favour, are notable by their absence.

The weather conditions were not promising for large hauls of moths on this night. The air temperature at dusk was only 10°C, falling to 8°C at 22.00h, 6°C at 23.30h, 3°C at 01.45h and only 1°C at 05.00h. The sky was completely clear, but at least there was no rain and only a very light breeze. A Great Prominent *Peridea anceps* (Goeze) had arrived by 22.30h in the trap amongst the oak trees and coppice stools in compt. 12, by which time we had also recorded the Barred Umber *Plagodis pulveraria* (L.), the Nut-tree Tussock *Colocasia coryli* (L.), the Pale Oak Beauty *Hypomecis punctinalis* (Scop.), the Seraphim *Lobophora halterata* (Hufn.), and the Poplar Lutestring *Tethea or* (D. & S.) as singletons at light in this compartment or along the

main ride. All of these are woodland moths of some note in the Oxford area, principally associated with hazel, oak and aspen, respectively, mainly in large ancient woods. By 23.30h a male and a female Poplar Hawk-moth *Laothoe populi* (L.) had been added.

Some of the group departed at midnight, while others stayed all night and caught some sleep in their cars. As a measure of how relatively poor the catches were, the actinic trap operated all night at the southern ride intersect captured just six moths, of six species—a Poplar hawk, a Coxcomb Prominent *Ptilodon capucina* (L.), a Scalloped Hazel *Odontoptera bidentata* (Clerck), a Pale Oak Beauty, a Common Marbled Carpet *Chloroclysta truncata* (Hufn.) and a Grey Pine Carpet *Thera obeliscata* (Hbn.). The Robinson traps did little better, with only twenty or fewer macro-moths per trap. In addition to some of the above named, the Plain Wave *Idaea straminata* (Borkh.) was the most noteworthy additional species. No additional species were added after 02.00h on this cold night. The leader recorded the catch at his two Robinson traps in full, that on the main ride capturing fourteen macro-moths of ten species, the other in the coppiced area eleven macro-moths of seven species. He was prepared to believe that the low catches were mainly a function of the weather on the night, but Martin Albertini and Peter Hall reported that catches had been below average almost every night they had been out light-trapping in Buckinghamshire that season. For comparison, the catch at the actinic trap in the intersection on 23 May 1984, when the dusk temperature was 13°C, dropping to a minimum of 5°C for the night, was 58 macro-moths of 21 species and this included two False Mocha, seven Maiden's Blush, two Birch Mocha *C. albipunctata* (Hufn.) as well as six Nut-tree Tussock and two Great Prominent.

Beating some of the hazel for larvae produced a Satellite *Eupsilia transversa* (Hufn.) and a Feathered Thorn *Colotois pennaria* (L.). At midnight a female Glow-worm *Lampyrus noctiluca* L. was seen illuminating to attract a mate on the main ride through Oakley Wood near its northern intersection.

The total list of adult macro-moths recorded on the night was 34 species. A copy of the full tabulation of results has been lodged with Martini Albertini as County Moth Recorder for Buckinghamshire.

According to Davis & Brook (2005) no False Mocha were seen anywhere in the British Isles on this National Moth Night but PW has been informed that one was seen in Sussex on 20 May, so at least this showed the flight season had started in the south.

The leaders thank all those who attended and helped to make this a very sociable and enjoyable evening, and especially the hardy people who stuck it out to run their traps all night. We thank the Forestry Commission for permission to hold the meeting and to bring our vehicles into the wood.

REFERENCES

- Bretherton, R.F. 1940. A list of the macro-lepidoptera of the Oxford district. *Proceedings and report of the Ashmolean Natural History Society* 1939: 25–70.
- Bretherton, R.F. 1941. Additions to the list of macro-lepidoptera of the Oxford district. *Proceedings and report of the Ashmolean Natural History Society* 1940: 22–23.
- Cribb, P.W. 1962. Dis-afforestation. *Entomologist's Gazette* 13: 153–154.
- Davis, T. & Brook, S. 2005. National Moth Night results: 22 May 2004. *Atropos* 25: 23–32.
- Dunk, H.C. 1956. Hell Coppice. *Entomologist's Record & Journal of Variation* 68: 158–159.
- Waring, P. 1990. The status in Bernwood Forest of moth species which are recognised as nationally uncommon. *Entomologist's Record & Journal of Variation* 102: 233–238.

- Waring, P. 2002. Some observations on False Mocha *Cyclophora porata* (Linn.) in Oakley Wood, Buckinghamshire, and Waterperry Wood, Oxfordshire. *Atropos* 15: 19–24.
- Waring, P. 2004. Wildlife reports—Moths. *British Wildlife* 15: 433–435.

CORRIGENDUM

In a previous field meeting report on this wood (BJENH 17: 250), a wrong photograph was selected at the printing stage. The lower photograph is Oakley Wood Ride Intersection 7 on the afternoon of 25 August 1985. The upper photograph is the same Intersection on 17 April 1984. However, the intention was to show how the trees and ride-side vegetation have encroached upon the rides in the last twenty years and made them narrower, and to show the deer fence that has been installed, by reproducing a photograph from the recent field meeting. This is now achieved with this report. Fig. 2 of this report shows Oakley Wood Ride Intersection 7 on 22 May 2004.

Otmoor, Oxfordshire, 26 June 2004

Leaders: **Paul Waring (PW) & Martin Townsend (MT)**—Otmoor in Oxfordshire is a site of which PW is especially fond, having explored it on a casual basis for Lepidoptera and other wildlife over a period of 35 years. Part of it was notified as an SSSI by the Nature Conservancy as early as 1952. This field meeting was the first of a planned series of five PW intends to lead for the BENHS, jointly with the Moths of Oxfordshire Recording Scheme (MORSE) and Butterfly Conservation's Upper Thames Branch. One meeting will take place annually in a different month each year, much as has just been completed for the Rushy Meadows SSSI, a site of somewhat similar habitat, also in Oxfordshire (see Waring & Townsend, 2005, and references within). As in the Rushy Meadows project, the opportunity is taken here to provide some background information to the site and to the recording of the Lepidoptera that has taken place there. The aims both of the field meetings and the reports that will follow are to compliment and augment the entomological records for various Orders summarised recently by John Campbell in Tremayne & Lackie (2001), with particular emphasis on the macro-moths, and to examine the effects of habitat management on the fauna. In the case of Rushy Meadows there appeared to have been no previous recorder of moths and no records prior to the 1970s. The Lepidoptera of Otmoor have been explored over a much longer period of time, although Walker (1926) does not mention the site once in his account of the macro-moths of the Oxford District. The only macro-moth record from an Otmoor locality mentioned in the section on Lepidoptera in the Victoria County History for Oxfordshire (Walker & Hobby, 1939) is a Minor Shoulder-knot *Brachylochia viminalis* (Fab.) taken in Prattle Wood by J.J. Walker. This record is repeated with only one other record from Otmoor, a Seraphim *Lobophora halterata* (Hufn.) also from Prattle Wood, captured by Russell Bretherton, date unspecified, in Bretherton's list of the macrolepidoptera for the Oxford District (Bretherton, 1940). The first supplement to this list (Bretherton, 1941) includes another record from Otmoor, a Gold Spot *Plusia festucae* (L.) "bred from pupa, June 1936, by A. Maitland Emmet". The second and last supplement to this list (Emmet, 1948) adds two additional and very important records for Otmoor: a Lappet *Gastropacha quercifolia* (L.) from "Studley one larva 17 May 1942 (Mrs Plant)" evidently considered a noteworthy find, and Marsh Fritillary butterflies *Euphydryas aurinia* (Rott.) on "Otmoor, common, 30 May 1944, B.B. Osmaston". The latter is in the section of the list

entitled "new localities for species previously recorded" and is presumably the discovery of this species on Otmoor, which is not listed among the Oxfordshire sites for the species by Walker (1926) or Walker & Hobby (1939).

The above few records are evidence that Otmoor was being visited by lepidopterists before and during the Second World War, but it is noteworthy that neither Walker nor Bretherton mention Otmoor as a special locality, unlike Cothill Fen and Bullingdon Bog, in their introductions to important Oxfordshire sites for Lepidoptera. It would appear from the above that Otmoor was not considered an unusual habitat or a special destination at that time (a conclusion also reached by John Campbell (*ibid.*) on the basis of the recording of other groups of insects at this time. It is concluded that there were probably no resident moth recorders in the "seven towns" of Otmoor before the Second World War or Bretherton would have mentioned more records, as he did in the case of other contributors to his list.

As yet the work of all the moth recorders since the Second World War has not been gathered together and there is currently no definitive historical list of moths for the site. It is hoped that one outcome of these meetings will be to stimulate the locally-based moth recorders to compile that list. This will enable us to see if each meeting is adding any new species or rediscovering species for which there are no recent records. Another major reason for embarking on this project now is that the RSPB has recently initiated an extensive programme of land acquisition, habitat change and management on Otmoor and the results of the field meetings will help monitor any changes in the moth fauna. An equally important reason for this series of meetings is that Otmoor still retains something of a timeless and wilderness quality, even though it is heavily managed, and it can be a magical locality in which to explore at night and to awake at dawn to inspect light-trap catches. We hope that other BENHS members will take the opportunity to join us over the next four years.

Otmoor means "fen of Otta" and is a roughly circular, very flat, poorly drained bowl of mainly Oxford clay, about 10 square kilometres (1000 hectares) in extent, lying on the north-east side of Oxford and is uninhabited, remarkably for lowland Britain today. Most of the surface is a uniform 59 m above sea-level. It is bordered by the villages of Beckley, Horton-cum-Studley, Murcott, Fencott, Charlton-on-Otmoor, Oddington, Islip and Noke which are on slightly higher ground consisting of Cornbrash to the north-west and Corallian grits and limestone to the south and east. The River Ray winds slowly through the site, fed by smaller streams and ditches. Habitats include an extensive system of ditches or dykes, mostly from the 19th century, with well vegetated banks, much open, rough pasture, some of which floods, with old and mature hedgerows and thickets, mainly of Common Hawthorn *Crataegus monogyna*. There is aquatic and marginal vegetation by the River Ray and developing reed-beds. Tree cover is limited. There are many willow trees, especially Crack Willow *Salix fragilis*, some pollarded, with the range of other broad-leaves increasing to the edges of Otmoor and including ash and Pedunculate Oak *Quercus robur*. These trees are mainly confined to the hedgerows but a block of oak woodland known as Otmoor Spinney was planted about one hundred years ago beside Otmoor Rifle Range, a part of the Moor which has been used for decades by the Ministry of Defence, initially from the 1930s for bombing exercises and latterly for fire-arms practice. There are a few small remnants of native broad-leaved woodland on the margins of Otmoor, notably Noke Wood and Prattle Wood on the south-west side, and in the north-east corner is Whitecross Green Wood, which has been planted extensively with introduced conifers. For most of its recorded history Otmoor has been a producer of wildfowl, crayfish, domestic geese and other produce associated with wetland and has been rough-grazing for cattle. It was not until well after the

Second World War that other agricultural uses were successful, though drainage had been attempted by the digging of the Outer and Inner Ring ditches which were installed between 1815 and 1820, following the Enclosure Acts (Tremayne & Lackie, 2001).

From 1969 to 1976 a major part of the western half of Otmoor was cleared and ploughed and big ditches installed in an attempt to drain it to grow arable crops, encouraged by numerous government grants and subsidies of that time. PW well remembers how deep, steep and hazardous the banks of the new dykes looked just after excavation and could hardly believe this engineering was happening. He fully expected to find mammals falling into the deep ditches and drowning. Once the banks and water margins became colonised by native vegetation it became clear that these works offered considerable additional opportunities for wildlife. Ron Louch (pers. comm.) monitored a great increase in many species of nesting song birds as a result, and these would have been exploiting increased populations of insects. Meanwhile barley and wheat were grown for some years on the drained fields, then this area was left uncultivated as agricultural "set-aside" and to revert until acquisition by the RSPB began in September 1997. Previously this ground had been wet grassland used as rough-grazing for beef cattle. The eastern half of Otmoor, of which the "Hundred-Acre Field" is a large proportion, has remained as rough grazing throughout this period and remains so today (see Hobson & Price, 1961 for an annotated map showing the traditional field names to be used in these reports). This particular field has also retained a particularly wet area, known as Fowl's Pill, on its west edge adjacent to the line of an old Roman Road. Fowl's Pill, or pool, floods in winter and remains damp most of the rest of the year. This was always the best place to flush Common Snipe, which are still present, and in winter it is frequented by flocks of various species of duck. Flooding of much larger areas occurs in some winters. The whole area was hunted by Short-eared Owls during the winter and sometimes three or four could be seen together in one day, which remains the case today. PW and Ron Louch regularly found Long-eared Owls roosting in the thorn hedges and bushes, especially in Joseph Stone Field in the centre of Otmoor, and breeding was confirmed. Curlew were heard every spring. Long-eared owls and curlews are still resident. Along the old ditches around the Hundred Acre field PW has had a number of sightings of Water Shrew and Grass-snake, especially in the mid-1970s when he visited Otmoor particularly frequently, and both species are still present. Those outer fields of Otmoor that have not been ploughed and reseeded still contain herb-rich grassland which is sometimes cut for hay or silage. One field on the north side by Charlton-on-Otmoor, known as Arthur's Acre has a traditional hay-cut in July. This field is full of Green-winged Orchids which are apparently one of the first plants to be lost following any artificial enrichment of the soil. Arthur's Acre was visited by PW briefly en route to the start of this field meeting, and a Blue-bordered Carpet moth *Plemyria rubiginata* (D. & S.) was flushed from the dense hedge of predominantly blackthorn which surrounds this field. Blackthorn in various places in and around Otmoor also supports the Black and Brown Hairstreak butterflies *Satyrrium pruni* (L.) and *Thecla betulae* (L.), both of which PW has recorded personally, both as adults and larvae. The populations of the *T. betulae* are currently monitored annually in the overwintering egg stage by David Redhead and his team of volunteers from Butterfly Conservation's Upper Thames Branch. The other lepidopteron for which Otmoor was well-known from the 1970s to the 1990s was the Marsh Fritillary. A sizeable population of this butterfly existed on the Range and in a couple of the neighbouring fields. The population was studied intensively by Keith Porter for his Ph.D. thesis (Porter, 1981). However, despite all the

accumulated knowledge that resulted from this study, the population was subsequently lost due to later mis-management of the habitat by cutting and over-grazing, the last butterflies being seen in 1996 (John Campbell, *ibid.*).

Among the many moths noted on Otmoor over the years and considered important in an Oxfordshire context are the Forester moth *Adscita statices* (L.), Emperor moth *Saturnia pavonia* (L.) and Fox moth *Macrothylacia rubi* (L.). PW saw the Forester moth in the fields known as Moor Leys and Otmoor Closes in the 1970s (i.e. by the current RSPB car park), and also on Otmoor Range. Mature larvae of the Emperor and Fox moths were sometimes encountered wandering over the ground in and around the range and young larvae of the Emperor were found on several occasions feeding gregariously on the leaves of Meadowsweet, which appears to be the principle foodplant used on this site, although others are available. Walker (1926) comments that the Emperor was considered scarce in the Oxford area in the 1920s and that indeed he had no recent records.

The RSPB has already made a considerable impact on Otmoor by creating scrapes and lagoons of open water in the western half where the arable crops were growing in the 1970s (Fig. 1). Many thousands of plants of Common Reed *Phragmites australis* have been grown and planted out by the water to establish large areas of reed-beds quickly, with the aim of attracting birds such as Bittern which have been recorded visiting Otmoor occasionally in the last few years.

In terms of monitoring the responses of the invertebrate fauna, the numbers of species and individuals of such reed-dependent moths as various of the wainscots (Noctuidae), the semi-aquatic species such as the China-marks (Pyrilidae) and other species associated with the water's edge will be of particular interest and will be scrutinised during field meetings.

This first meeting comprised an afternoon session from 14.30h and an evening session from 20.00h, with the opportunity for meals in the Abingdon Arms Public



Fig. 1. New lagoons created by RSPB at Otmoor, 24 June 2004.

House in the nearby village of Beckley prior to each session. For the daytime meeting PW was joined by Ivan Wright, and Gordon and Joyce Ushaw.

Unfortunately the weather was unfavourable for insect activity throughout the afternoon. It was cool and overcast with intermittent showers, some heavy, as forecast, which undoubtedly deterred attendance. Apart from the occasional insect disturbed as we walked through the wet rough swards, very few flying insects were seen. The vegetation was too wet to beat or sweep but the uncut swards in the fields by the Rifle Range were full of flowers of such localised plants as Saw-wort *Serratula tinctoria*. With the aid of his waterproof map, Nick Droy from the RSPB gave us an excellent introduction to the RSPB acquisition of land at this site, the objectives and the recent habitat management by the RSPB since 1997.

For about the thirty minute duration of Nick's open-air presentation, PW had pheromone lures suspended in a stand of crack willow at the RSPB car park by Moor Leys field in the faint hope of attracting Red-tipped Clearwing *Synanthedon formicaeformis* (Esper). As his experience is that clearwings are seldom attracted except in warm, usually sunny, weather, this was more a demonstration of the method than an effort likely to produce a positive result. No clearwings were seen and the lures were packed away when it began to spot with rain.

A Shark moth *Cucullia umbratica* (L.) was found at rest on one of the posts of the boundary fence of the field adjacent to the MOD Rifle Range. A female Common Darter dragonfly *Sympetrum striolatum* (Charp.) was plucked torpid from its roost in the sward. We disturbed a Little Owl from one of the mature oak trees by the main access track to the range and a curlew flew over. A few Ringlet butterflies *Aphantopus hyperantus* (L.) were flushed and a single male Marbled White *Melanargia galathea* (L.). No Forrester moths were found.

Next we inspected the areas where the RSPB has created a system of scrapes, lagoons, channels and redbuds. Reed Warblers were already established in the reed beds and calling. We saw four Little Egrets by the scrapes, and a Great Crested Grebe with a chick in one of the lagoons. A stoat and a hobby were also seen. There were plenty of mosquitoes along the dykes and in rank vegetation but PW managed to keep the inside of his car a mosquito-free zone.

PW was pleasantly surprised that the traffic on the M40, which was built in the late 1980s, could not be heard on this occasion and there were virtually no street lights or domestic lighting visible from the central part of Otmoor—so the wilderness quality of the place is still somewhat unspoilt when the wind is blowing in the right direction. PW operated two Robinson light-traps all night, one on the top of the raised ditch bank on the northern edge of Moor Leys and Otmoor Closes in the shelter of tall willows near the pump-house (SP 568129) (Fig. 2), the other in open rough grassland by a water channel, the main dyke and on the edge of grazing marsh. There was soon a cluster of moths and other flying insects around the bulbs—which is always a sign of a promising night. PW had wanted to operate light-traps here for many years, ever since his couple of productive sessions trapping on Otmoor Range in the mid-1980s, and now it was happening.

MT arrived in time to set up his light-traps before dark, operating two Robinson traps near the RSPB car-park, in the ancient hedge-lined track that leads out across the Moor (SP 571128).

The dusk air temperature was 15°C and there was full cloud cover but no rain. A light wind dropped to almost nothing as darkness fell. Weather conditions were as near to ideal as this throughout the night while we slept in our cars for a few hours. We were up from 04.30h to examine the catches in our traps as soon as it was light and it took until 07.15h to record the catches in full. Fortunately continuing cloud



Fig. 2. Moth trap site on northern edge of Moor Leys, Otmoor, 24 June 2004.

cover ensured it was not bright and sunny at this time and the moths remained quietly at rest until released.

The two traps captured a combined total of 84 species of macro-moth, the trap on the bank trapping 267 individuals of 70 species, the trap in the open 285 macro-moths of 59 species. In the catches the more noteworthy of the macro-moths, and other moths associated with wetland included, with numbers for open ground and hedged ditch bank respectively, the Obscure Wainscot *Mythimna obsoleta* (Hbn.) (3, 3), Oblique Carpet *Orthonama vittata* (Borkh.) (1, 0), Round-winged Muslin *Thumatha senex* (Hbn.) (1, 2), Blackneck *Lygephila pastinum* (Treit.) (2, 4), Double Lobed *Apamea ophiogramma* (Esper) (1, 0), Small Clouded Brindle *Apamea unanimitis* (Hbn.) (1, 0), Cream-bordered Green Pea *Earias clorana* (L.) (one in good condition by the willows), Small Seraphim *Pterapherapteryx sexalata* (Retz.) (2, 3), Beautiful Hooktip *Laspeyria flexula* (D. & S.) (1, 3), Bordered Sallow *Pyrrhia umbra* (Hufn.) (0, 1) and Double Dart *Graphiphora augur* (Fab.) (3, 1). Large numbers of Dingy Shears *Parastichtis ypsilon* (D. & S.) were found by the hedgerows and ditches (14) but not in the open ground (5). Quite the opposite was found for the Dark Arches *Apamea monglypha* (Hufn.), which feeds as a larva on grasses: there were 17 in the Robinson trap on the ditch bank by a hedge and 105 in the identical trap in the open ground beyond. The catch for the night included two male Lappet (one in each trap) and eight Lackey moth (4, 2) including one female, and both yellow and reddish forms of the male. Both the last two species have been flagged up by the Rothamsted Insect Survey as in decline nationally, so it was good to see them still present at this site. Amongst the microlepidoptera there were four of the *Typha*-dependent pyrale *Calamotropha paludella* (Hbn.) in the bank trap and ten by the water channel. Two Brown China-mark *Elophila nymphaeata* (L.) were recorded at the former, three at the latter.

The two Robinson traps operated by MT in the lane captured a total list of 77 species of macro-moth and 44 species of microlepidoptera, including 22 Lackey moths, 19 Beautiful Hook-tip, three Sloe Pug *Pasiphila chloerata* (Mab.), two Oak Nycteoline *Nycteola revayana* (Scop.) but no Lappet moths. The Dark Umber *Philereme transversata* (Hufn.), the Brown Scallop *Philereme vetulata* (D. & S.), the Small Seraphim and the Dingy Shears were also recorded amongst more numerous geometrids, prominents and others, and the woody larval foodplants of all of these were well represented in these old hedgerows. Many species dependent on field layer plants of more open ground were also captured here, including Round-winged Muslin, Four-dotted Footman *Cybosia mesomella* (L.), one Southern Wainscot *Mythimna straminea* (Treit.), nine Blackneck and the Double Dart. Noteworthy wetland species as the Oblique Carpet and the Obscure Wainscot were not detected this distant from the ditches and water margins on this occasion, and no Lappet moths despite the traps being adjacent to hedgerows.

While packing up the traps in the morning a Corn Bunting *Emberiza calandra* was singing near PW's car parked on the dyke bank, possibly the first noted for five years (det. Peter Barker). A Song Thrush was also in full chorus.

From all the above, it can be concluded that much of the fauna that PW had recorded on Otmoor during the 1970s and 1980s, was still present, and that we can look forward to further discoveries and rediscoveries in future field meetings. Excitingly, it is reasonable to expect that the populations of many of the distinctive wetland species will increase as a result of the various new habitat management projects, and that the results from further field meetings, together with monitoring by the RSPB and others, will help to demonstrate this.

The previous evening (25 June) PW had operated a single Robinson trap all night on the edge of Otmoor in the garden of Gordon and Joyce Ushaw at The Grove. This produced exactly 200 macro-moths of 33 species, including five Lackey moth, a Double Dart and a Gothic *Naenia typica* (L.). That night was clear and calm with a half moon, a dusk temperature of 14°C and a night minimum of 7°C.

The leaders would like to thank Neil Lambert, John Harrison and Barbara Reason of the RSPB for their permission and assistance in holding this meeting, Harvey Swift, Range Manager, for permission to examine the MOD Rifle Range and neighbouring holdings, Nick Droy from RSPB for explaining the RSPB plans to us, Gordon and Joyce Ushaw for their hospitality and for supporting the meeting, along with Ivan Wright. A full list of the species recorded during this meeting, together with a copy of this report, has been deposited with MT, as County Moth Recorder for Oxfordshire.

REFERENCES

- Bretherton, R.F., 1940. A list of the macrolepidoptera of the Oxford district. *Proceedings of the Ashmolean Natural History Society of Oxfordshire* **1939**: 25–70.
- Bretherton, R.F., 1941. Additions to the list of macrolepidoptera of the Oxford district. *Proceedings of the Ashmolean Natural History Society of Oxfordshire* **1940**: 22–23.
- Emmet, A.M., 1948. Second supplement to the list of macrolepidoptera of the Oxford district by R.F. Bretherton. *Proceedings and report of the Ashmolean Natural History Society of Oxfordshire* **1941–47**: 47–55.
- Hobson, M.G. & Price, K.L.H., 1961. *Otmoor and its seven towns*. Oxford.
- Porter, K., 1981. *The population dynamics of small colonies of the butterfly Euphydryas aurinia*. Ph.D. thesis. Oxford University.
- Tremayne, B. & Lackie, A., 2001. *Otmoor 2000AD*. The Otmoor Group. Charlton-on-Otmoor.
- Walker, J.J., 1926. *The natural history of the Oxford district*. Oxford University Press. Oxford.

- Walker, J.J. & Hobby, B.M., 1939. Lepidoptera. In: Salzman, L.F. (Ed.) *The Victoria history of the County of Oxfordshire* 1: 82–106.
- Waring, P., 2004. Wildlife reports—Moths. *British Wildlife* 15: 433–435
- Waring, P. & Townsend, M., 2005. Field meeting report—Rushy Meadows SSSI, Kidlington, Oxfordshire, 21 May 2004. *British Journal of Entomology and Natural History* 18: 64–68.

Stoborough Heath RSPB reserve, Wareham, Dorset, 30 July – 1 August 2004

Leaders: **James Cadbury** and **Andy Schofield**.—There were 11 participants and on the night of 31 July/1 August fifteen mv light traps were operating. These covered dry open heath, wet/damp mire and birch/sallow scrub. The weather was fine, good for netting in the day but a clear moonlit sky was not ideal for moth trapping. With churring nightjars and the explosive alarm whistles of Sika deer it was exciting to be out on the heath after dark.

The aim was to update the Lepidoptera records for Stoborough Heath which had been somewhat neglected by comparison with the nearby Arne RSPB reserve where Bryan Pickess (former warden) recorded 431 species of macro-moths and 366 ‘micros’ between 1966 and 1996. Stoborough, however, was in the 1970s and 80s a collecting ground for B. Withers who lived locally. Target species were the Dingy Mocha *Cyclophora pendularia* (Cl.) and Speckled Footman *Coscinia cribraria* (L.), two Red Data Book species.

One fresh Dingy Mocha (a Biodiversity Action Plan species) obliged at a site where Withers had taken specimens in 1983 and 1984. Members of the group had recorded Speckled Footman at another Dorset heath the previous night but none came to light at Stoborough, even though traps were specially located on an extensive area burnt in 2001 where Bristle bent *Agrostis curtisii*, the now considered food-plant, was abundant.

Among the most abundant moths were some characteristic heathland species: c. 200 Scarce Footman *Eilema complana* (L.), 100 True Lover’s Knot *Lycophotia porphyrea* (D. & S.), 60 Grass Emerald *Pseudoterpna pruinata* (Hufn.)—mostly netted by day, 30 July Belle *Scotopteryx luridata* (Hufn.)—also day-flying, 30 Horse Chestnut *Pachycnemia hippocastanaria* (Hb.) and 20 Beautiful Yellow Underwing *Anarta myrtilli* (L.) most of which came to light.

Netting by day and at dusk produced ten Bordered Greys *Selidosema brunnearia* (Vill.) Na. and eight Small Purple-barred *Phytometra viridaria* (Cl.). Four Notable (Nb) species associated with the botanical rich mires were a Rosy Wave *Scopula emutaria* (Hb.), a Purple-bordered Gold *Idaea muricata* (Hufn.), five Small Chocolate-tip *Clostera pigra* (Hufn.) including one on Creeping willow *Salix repens*, a food plant, and 21 diminutive Marsh Oblique-barred *Hypenodes humidalis* Doubl. The p RDB *Crambus silvella* (Hbn.) was another species of the mires.

Two other Nb species were three Dotted Border Waves *Idaea sylvestraria* (Hb.) and less expectedly two Kent Black Arches *Meganola albula* (D. & S.). Among the nationally local species were Birch Mocha *Cyclophora albipunctata* (Hufn.), Maiden’s Blush *C. punctaria* (L.), Dwarf Cream Wave *Idaea fuscovenosa* (Goeze), Treble Brown Spot *I. trigeminata* (Haw.), Plain Wave *I. straminata* (Borkh.), Scalloped Shell *Rheumaptera undulata* (L.), Small Seraphim *Pterapherapteryx sexalata* (Retz.)—12 individuals, both Peacock *Macaria notata* (L.) and Sharp-angled Peacock *M. alternata* (D. & S.), Brussels Lace *Cleorodes lichenaria* (Hufn.), Annulet *Charissa obscurata* (D. & S.), Chocolate-tip *Clostera curtula* (L.), Rosy Footman *Miltochrista miniata* (Forst.)—15 individuals, Buff Footman *Eilema depressa* (Esp.), Bird’s-wing *Dypterygia scabriuscula* (L.), Double Kidney

Ipimorpha retusa (L.), Small Rufous *Coenobia rufa* (How.) and Bordered Sallow *Pyrrhia umbra* (Hufn.). Most if not all the ten Dark Tussocks *Dicallomera fascelina* (L.) were females. They characteristically rest with their fore legs stretched out in front of the head. Four *Oncocera semirubella* (Scopoli), an attractive Nb pyralid with pink forewings, may have wandered from the chalk on the coast.

A total of 134 'macro'-moth species that included one RDB3, 1 Na, 7 Nbs and 23 local species plus 56 'micros' were recorded.

In addition, Silver-studded Blues *Plebejus argus* (L.) were flying in small numbers over the damp heath while Graylings *Hipparchia semele* (L.) were frequent on the tracks and other bare ground. Dragonflies included a Golden-ringed *Cordulegaster boltonii* (Donovan), small numbers of Keeled Skimmer *Orthetrum coerulescens* (Fab.) around mires and flooded craters, and Black Darters *Sympetrum danae* (Sulzer). Mike Parker and Andy Schofield benefited from the fine weather to collect Diptera. The meeting coincided with an emergence of the RDB Small Bee Fly *Bombylius minor* L. (RDB2). The horsefly *Chrysops sepulchralis* (Fab.) (RDB1) and the local hunchback fly *Paracropera orbiculus* (Fab.) (Acroceridae), were among the species recorded.

The RSPB was delighted with the outcome and wishes to thank participants for their important contribution to the knowledge of the biodiversity of the Stoborough Heath reserve.

BOOK REVIEWS

Atlas des Coccinelles de la Manche by Y. Le Monnier & A. Livory. ISSN 1259-5411. Dossier no. 5 (Manche-Nature, Coutances, 2003) 206 pp. Hardback 40€, p&p, 7€, available from manche-nature@wanadoo.fr

As there may be some confusion, I should start by saying that the 'la Manche' in the title of this book is the département of France which lies south of Cherbourg and is not the stretch of sea separating France from England. It may also seem strange to review a local French distribution atlas in this journal. However, many of the species included are found in the British Isles, others could well appear here in the future, and the region is one often visited by travellers from Britain.

The atlas covers 53 species, although only 48 were found during the fieldwork for the atlas which took place from 1998 to 2001. For each of the species there is a distribution map, a colour illustration (one species is represented by a black and white line drawing) and an account of the species' biology. In addition there are introductory sections covering the geology, climate and habitats of la Manche, the methodology of the survey and general ladybird biology. There is an illustrated key to the adult ladybirds of la Manche which also includes some additional species so that the key may be used throughout north-west France (the regions of Brittany, Normandy and the northern part of the Pays de la Loire) and, for that matter, with the exception of *Scymnus* (s. str.) in the British Isles. The book concludes with short sections on the present status of the species in la Manche, the attraction of ladybirds to MV light and species lists for each of the Channel Islands (les îles Anglo-normandes).

The colour illustrations are the most striking feature of this book. Most of these are taken from original watercolours of local specimens by one of the authors Yves Le Monnier (a professional entomologist and amateur watercolourist). Each illustration is many times life size occupying about a quarter of the 300 × 210 mm sized page. The large illustrations are accompanied by much reduced versions showing the specimens at life size. For the more variable species a selection of colour forms is also shown. The illustrations are generally accurate and make species recognition easy, but for some species the colours seem too saturated. Thus the ivory/white colour of the pronotums of *Hippodamia variegata* Goeze, *Adalia bipunctata* (Linn.) and *Oenopia conglobata* (Linn.) have become a lurid yellow and the white spots of species such as *Calvia 14-guttata* (Linn.) have become yellow. This overuse of yellow may, of course, be a fault of the printing process rather than of the original painting but it could mislead the novice more concerned with colour than with pattern and should be corrected if the illustrations are ever reprinted.

Aside from the illustrations, many readers will be struck by the distribution maps which, rather than being traditional dot maps, show the distribution by commune (the smallest French administrative area) of which there are 648 of a variety of irregular shapes and sizes in la Manche. The authors refer to the 'dilemma' of deciding upon a recording unit and give their reasoning for the use of the commune. Having made their decision, it is interesting to see that the distribution map of the plant *Bryonia dioica* Jacq. in la Manche, which they reproduce on p. 187, uses a map grid which would have been perfectly acceptable for this atlas. Part of the problem may be in obtaining grid references from the French Institut Géographique National (IGN) maps. It is to be hoped that the inclusion of the 1km UTM grid on the latest 1:25000 IGN maps will make recording easier in future. At a quick count there are records for 60% of the 648 communes. It is disappointing to see that most of the northern half of the Cotentin peninsula is unrecorded and there are other large gaps. The authors point out that there was a limit to what could be achieved in four years but do not say why the field work was limited to four years. If it had to be limited then an effort should have been made to make the recording more evenly spread. As it is, the maps are clearly incomplete which means that they are the least useful part of this work.

The accounts of each species vary greatly in length, with more pages being devoted to the common species for which there is a greater amount of information. Many of the observations are quantified rather than just anecdotal. These accounts contain much useful information which, in many cases, has been derived from observations made in la Manche. The habitat information is particularly helpful as is the phenological information which is summarised for each species in a histogram showing the number of records by month. There are frequent references to the British literature with which the authors are clearly familiar.

I have not had an opportunity to test the key but as it relies more on structural characters than on colour pattern it should be effective. An additional nine species, not included in the species accounts, have been included in the key to make it useful over a larger geographical area. Only two species from the British Isles, *Scymnus schmidti* Fürsch and *S. femoralis* (Gyllenhal), are not included in the key. The key includes species such as *Rhizobius chrysomeloides* (Herbst) and *Epilachna argus* (Geoffroy) which have recently become established in the British Isles and others that have been recorded occasionally, for example *Coccinula 14-pustulata* (Linn.) and *Exochomus nigromaculatus* (Goeze). It also includes species that are likely to find their way here in the future. The key should, therefore, be useful to British and Irish

entomologists when confronted with unusual ladybirds that might have originated from the near Continent.

Overall this is a good book and compares favourably with Roger Hawkins' *Ladybirds of Surrey* (published by the Surrey Wildlife Trust in 2000) which must be the benchmark for this type of publication. Like Hawkins' book it will be useful over a greater geographical area than its parochial title would suggest. I recommend it to all readers with an interest in the ladybirds of the British Isles and the closer parts of the Continent, even if you have to brush up on your French first.

JOHN MUGGLETON

The leafhoppers and planthoppers of Germany (Hemiptera, Auchenorrhyncha): patterns and strategies in a highly diverse group of phytophagous insects by Herbert Nickel. (Pensoft Publishers, Sofia, 2003). 460pp. Hard cover £50.00. ISBN 1312-0174.

It is surprising that relatively few entomologists have taken up the study of leafhoppers and planthoppers in the UK despite a full set of RES Handbooks on British species and a national Recording Scheme. Primary movers in this field have tended to be central European and this applies especially today with a group of German, Austrian and French hemipterists cooperating to describe and catalogue the central European fauna in a holistic way. An essential part of this process has been to identify the host plant range of the various species. The first part of this book is devoted to brief accounts of 145 fulgoromorph and 474 cicadomorph species known to occur in Germany with information on their life cycle, phenology, habitat requirements, host plants, relative abundance and distribution. Although some of the information was obtained from the literature, a substantial amount of new data is included based on the author's field studies which span a 12 year period. During this time he accumulated approximately 30,000 site records, 8,600 referable to plant species. Dubious records are discussed in the light of current knowledge. The book is thus a checklist of the German fauna.

The second part of the book is devoted to analysing feeding preferences with useful tables listing species according to host plant. More than 45% of species are associated with graminaceous and dicotyledonous plants, with smaller numbers found on pteridophytes, gymnosperms and non-graminoid monocots. The highest numbers of species are associated with Poaceae and Cyperaceae (300 sp.) whereas Fagaceae, Betulaceae, Salicaceae and Rosaceae are attacked by approx. 50 species. Some highly diverse plant groups such as the Caryophyllaceae, Brassicaceae, Apiaceae (umbellifers) and Scrophulariaceae are rarely attacked. Due to large differences in the number of plant species per family, the ratio of hopper species per plant is higher for woody plants than graminoids. Thus Auchenorrhyncha species richness is highest on plant groups that are either rich in species (graminoids) or in biomass (trees and shrubs), a conclusion that supports the apparency hypothesis.

Host specificity is discussed in detail, with most hoppers restricted to one or a few plant species. Hidden within this book is a wealth of information about leafhopper biology and a quick glance through suggests that quite a number of new species remain to be discovered in the UK based solely on hostplant associations. New insights abound, and though I appreciate that nettle supports a rich fauna, I had never considered *Phragmites australis* (Common reed) in a similar light. This book is the leafhopper equivalent of Maitland Emmet's 'Life history and habits of the British Lepidoptera' (*MBGBI* 7:2) and as such is a key work on this group of insects. The

author is to be congratulated on amassing and analysing so much data and making it available in a highly readable and interesting form. Verdict: a must buy.

JOHN BADMIN

Hazards of Butterfly Collecting. By Torben B. Larsen. A compilation of previously published accounts, with 147 illustrations and photographs. 256 pages. Cravitz Printing Company, 2004. Softcover £11.99 UK, £13.99 overseas, including postage. ISBN 0-9548375-0-9. Available from the publisher, cravitzprinting@btconnect.com

How much entomologising can be squeezed into a lifetime? BENHS members will be aware that Torben Larsen has chased butterflies in many of the world's exotic if unsavoury localities, and has experienced more than his share of adventure whilst naming over a hundred new taxa. Many will have read his light-hearted accounts as a series entitled "Hazards of butterfly collecting", published over the years in the pages of *Entomologist's Record and Journal of Variation*. These articles have taken us from Copenhagen to Hanoi by way of New Delhi and Benin, experiencing arrest, blindness, cyanide, Kalashnikovs, malaria and leeches, not to mention the encounters with drunken soldiers, snakes, wild animals and colourful locals.

This little volume pulls together 95 of these entertaining episodes, not in chronological sequence, but in a way that allows the reader to dip in to particular themes. Every tale is about the pursuit of butterflies, and many have a moral to them, but the main purpose, as Torben explains, is to raise a chuckle. Amongst my favourites were two stories about ad hoc experimentation into the effectiveness of aposematic coloration and mimicry; the first involved feeding butterflies to a chameleon, the second proved the instinctive fear that monkeys have for snakes—a fear that offers some protection to larvae large enough to imitate snake behaviour.

Readers repelled by the idea of such experiments, or by talk of killing jars and butterfly collections, will be placated by his shrewd insights on eco-systems, habitat destruction and butterfly ecology. Many of these were observations made ahead of their time to government departments able to influence the development of agriculture and ecotourism, and revealing his true colours as a pioneering conservationist.

An earlier and slimmer compilation of these stories was described by an unkind reviewer as "A pointless and irrelevant exercise in self-glorification". Judge Torben's modesty for yourself, but I expect that new readers will warm to the entomological expertise and ready wit of our Danish Indiana Jones.

ROB PARKER

Provisional atlas of the British aquatic bugs (Hemiptera, Heteroptera). By Thomas Huxley. (Biological Records Centre, 2004). 118 pp. Paperback. Price £8.00. ISBN 1 870393 67 8. Available from the BRC, Monks Wood, Huntingdon PE28 2LS.

This is the most recent of a series of provisional atlases published by BRC, and this is the best yet. It starts off with the usual Foreword, Acknowledgements, Checklist and Introduction. In the introduction water bugs are clearly defined and most of their life histories and requirements briefly explained. Here are found illustrations of all the eleven families so that anybody, even the raw novice, will have no problems in

placing any species to family. The introduction also gives details about the atlas, the history of recording, how the records were gathered, checked and managed.

The main part of the book comprises the distribution maps and species accounts. With one species per page, each species has a map showing its recorded distribution in Great Britain, pre-1970 records shown in open circles, post-1970 records with solid dots. Recording the distribution of any plant or animal can never be 100% complete, first is the problem of getting full coverage over the whole country, and secondly, the range and status of any species is constantly evolving. However, the resultant maps in this Atlas give a very clear picture of the present known distribution of each species. *Gerris lacustris* (L.) is to be found throughout Great Britain, *Sigara selecta* (Fieber) only along the south-east coast, whilst *Sigara scotti* (Douglas & Scott) is mainly a northern species but with a few scattered records throughout the rest of the country, are examples of the various distribution patterns for each species. On each page the distribution is discussed in detail to help clarify the map. There is also a line or two on the actual habitats in which each species is to be found, of particular value if one is searching out any specific bug. Finally, there is one particularly useful paragraph called Helpful Hints. These really are what they say with tips on distinguishing between similar species, often with a line drawing of the critical feature. With these helpful hints together with the line drawings to families it should be possible for recorders without previous experience of this group to name a high percentage of any species that they find. For the more critical species reference is given to where further details can be found.

There follow some six appendices which map and list vice-county totals, give tables of species per vice-county, provide a gazetteer of localities, list suggestions for improving recording, and give hints on mounting specimens plus details of obtaining identification guides, records cards and maps. A very helpful glossary, three pages of references, and a full and clear index follow these.

A national scheme for recording aquatic bugs was launched in 1983 and this has plodded along steadily until Thomas Huxley took the helm in 1999. In five short years he has, among other things, sorted out the backlog of records, encouraged recorders for fresh data, gathered up data and written up this Atlas, and must be congratulated in producing such a splendid publication. This Provisional Atlas of British aquatic bugs is a must for the shelves of every entomologist, or pond-dipper, with even the slightest of interest in the aquatic Heteroptera.

ERIC G. PHILP

The Aurelian's Fireside Companion—an entomological anthology by Michael A. Salmon and Peter J. Edwards. Paphia Publishing Ltd 2005. 428 pp. Hardcover £35.00 plus £5.00 postage and packaging. ISBN 0 9537236 1 5.

In putting together *The Aurelian's Fireside Companion*, Michael Salmon and Peter Edwards have created a weighty (over four hundred pages) anthology of writing on butterflies and moths and their study by generations of entomologists.

The compilers have selected more than two hundred articles and extracts from entomological journals (and occasionally other sources) as far back as the first issue of *The Entomological Magazine* in 1833. The focus is not on the science, however, but, in the best tradition of other fireside and bedside books, on items considered likely to inform, entertain and amuse. Most of the articles are from the Nineteenth

Century and the first half of the Twentieth Century, when, it seems, there was ample room in the journals for anecdote, reminiscence and even doggerel verse.

Yet this book has more than just literal weight. We learn about the early experience of sugaring and the first 'Eddystone Light' traps, and join intrepid (perhaps sometimes foolhardy) entomologists on collecting trips to places as far apart as The Burren and Dalmatia. We sit in on heated debates on collecting and its impacts on population survival. We see new knowledge unfold, from an understanding of which species properly belong on the British list (and which were the result of wishful thinking or deliberate fraud) to the life-cycle of the Large Blue.

One of the delights of the book is to come across references to places you know – in my case, a swallowtail butterfly pursued over Darland Banks, near Chatham in Kent, in 1857 – and one of the sorrows the clear impression of how much the countryside has changed. To read of the Large Copper, of swarms of Heath Fritillaries, of the great abundance of insects encountered by Victorian collectors is to realise the unhappy, current state of our invertebrate fauna.

But the clearest impression left by this chunky volume is of the individual entomologists themselves. The old photographs may show forbidding countenances and fearsome whiskers, but the words demonstrate the warmth, wit and passion which lay beneath. And not least the plain, physical fortitude required if field naturalists were to pursue their hobby without cars or even properly paved roads.

The book would have benefited from a little more care in lay-out. The authors have clearly aimed for a book which can be dipped into rather than tackled in chunks; more spacing between items, and arrangement of the material into more than just seven chapters would have made this far easier. As it is, articles are, in many cases, grouped together and have to be tackled as a piece in order to get the benefit: not a problem for a reviewer, but perhaps less inviting for a fireside reader.

Nonetheless, I read this book with genuine enjoyment. I found myself informed, amused and entertained by turn, and with a greater appreciation of what it meant to be an entomologist a hundred and more years ago.

RICHARD MOYSE

The Monarch Butterfly, biology and conservation. Edited by K.S. Oberhauser & M.J. Solensky. (Cornell University Press, Ithaca, 2004). 248 pp. Hardback £22.95. ISBN 0-8014-4188-9.

This book was inspired by a conference on the monarch butterfly hosted by 'Monarch Watch' and 'Monarchs in the Classroom', two dedicated watch groups organised by staff at the Universities of Kansas and Minnesota, respectively. There are 27 chapters covering the latest information on breeding, migration and overwintering biology of *Danaus plexippus* (L.). The content of these varies tremendously, though the editors are to be congratulated on maintaining a similar general style throughout. This book is aimed largely at an American audience and it will be interesting to learn how popular it has been with the general public. Having a national butterfly is a wonderful way of bringing scientists and the public together to work for a common cause. Perhaps we might benefit from having a national butterfly in the U.K.

JOHN STEWART

Insect sampling in forest ecosystems, edited by S.M. Leather. (Blackwell Publishing, Oxford, 2005). 303 pp. Softback £34.99. ISBN 0-632-05388-7.

One of the interesting facets of reading scientific entomological literature is to discover how the authors conducted their sampling, as new techniques can lead to discoveries and new insights into how insects live. This book brings together professional entomologists from around the world who have experience of sampling insects from a wide range of habitats, to write critical essays about their own specialist areas. Rather than reiterate established methods, the authors have been encouraged to discuss new technologies, often borrowed from other disciplines that ecologists can apply to their work. There are chapters on sampling insects from roots, pitfall trapping, sampling forest canopy and understorey vegetation, sampling insects from trees: shoots, stems, trunks and rot-holes.

There are additional chapters on sampling insects in flight, termites in soil (a more difficult problem that you might imagine) and how to estimate numbers of predators and parasitoids. There is a lot of good information and advice in each chapter and it would be invidious to select any one for special attention – they all need reading. However I most enjoyed reading the opening chapter on sampling theory and practice by Simon Leather and Allan Watt- a must for any field ecologist to read. This is a book to delve into, when you need some inspiration on how to sample insects, since a novel method might prove to be significantly superior to the one you have been using – all those rare beetles are really quite numerous. I recommend acquiring a copy for your bookshelf.

JOHN BADMIN

Jewels in the Air DVD. By Roger Kemp (Pukka Home Entertainment, 2006). £19.99, available via info@jewelsintheair.com

Originally produced as a combined booklet and video guide to British butterflies, this is now available in DVD format. All the butterflies known to breed in the British Isles are filmed in their natural habitats—the footage is remarkably natural and obviously taken by an expert rather than a professional with an eye for the spectacular. Conservation of butterflies is stressed throughout. The DVD would make an ideal present for any entomologist, young or old, and it might turn out to be one of those films one revisits from time to time to remind oneself how common some butterflies used to be ‘just a few years ago’.

The DVD also contains an extensive stills gallery with detailed images of individual species for use as a reference guide. One can easily zoom in and out to look at the finer details of wing patterning to confirm identification. For those who take digital photographs of insects, it would be nice to have a split computer screen facility to compare photos taken in the wild, with those on the the DVD—something for the future.

JOHN BADMIN

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